

THE ORGANIZATIONAL IMPACT OF C/SCSC  
UPON THE SUPERVISOR OF SHIPBUILDING

Thomas Arthur Fitzgibbons

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## THESIS

THE ORGANIZATIONAL IMPACT OF C/SCSC  
UPON THE SUPERVISOR OF SHIPBUILDING

by

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The Organizational Impact Of C/SCSC  
Upon The Supervisor Of Shipbuilding

by

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Lieutenant, United States Navy  
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Submitted in partial fulfillment of the  
requirements for the degree of

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ABSTRACT

Developing a management control system that will meet the needs of the government and its contractors has been a difficult task, particularly in shipbuilding. Only two Supervisors of Shipbuilding, SUPSHIPS Bath and Groton, have been involved with the implementation of the Cost/Schedule Control Systems Criteria on a major shipbuilding contract. The approach taken by each was quite different, and both differed from the NAVSEA suggested approach. These approaches are analyzed and measured against skill and training standards outlined by the Joint Logistic Commanders, in order to determine the advantages and disadvantages of each. Lastly, an approach is recommended to NAVSEA and SUPSHIPS which incorporates the lessons learned.



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## LIST OF ABBREVIATIONS

BRS	Business Review Staff
CAS	Contract Administration Service
C/SCSC	Cost/Schedule Control Systems Criteria
DCAA	Defense Contract Audit Agency
DCAS	Defense Contract Administration Service
DOD	Department of Defense
DODI	Department of Defense Instruction
GAO	General Accounting Office
NAVMAT	Naval Material Command
NAVPRO	Naval Plant Representative Office
NAVSEA	Naval Sea Systems Command
NPD	Navy Procurement Directives
PED	Production Engineering Division
PERT	Program Evaluation and Review Technique
SACAM	Ship/Acquisition Contract Administration Manual
SKIP	Skill/Knowledge Improvement Program
SUPSHIP	Supervisor of Shipbuilding, Conversion and Repair



## I. INTRODUCTION

### A. PURPOSE

The purpose of this thesis is to describe a standard for approaching implementation of the C/SCSC as they are applied to the shipbuilding industry. This standard, in the form of skills and training required, will be that proposed by the Joint Logistics Commanders in the Joint Implementation Guide [Ref. 1] augmented by additional skills of particular importance to the Supervisor of Shipbuilding (SUPSHIP) in administering a C/SCSC contract under the Department of Defense policy of "Engagement." Against this standard, a description and analysis will be conducted of the alternative organizational approaches and skills utilized by those SUPSHIPS who are presently involved. In addition, some suggestions are offered for Naval Sea Systems Command (NAVSEA) and SUPSHIPS who are about to become administrators of a major defense contract. These suggestions are not advanced as instant cures for the problems, but as ideas to be considered and discussed in the hope that previous mistakes and difficulties are not needlessly repeated. In that respect, perhaps this thesis will serve as a "pass down the line" document among the SUPSHIPS.

It is also important at the outset to discuss what accomplishment is not intended. No checklist will be provided for Supervisors of Shipbuilding in establishing their organizations and preparing for a major contract containing a requirement for C/SCSC, nor is any panacea .

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DODI 7000.2 and C/SCSC are used interchangeably.



presented for problems related to the implementation of Department of Defense Instruction 7000.2 in the contract administration arena. It is true that at the beginning, some hope was entertained that such a checklist could be presented which would be suitable for use by all SUPSHIPS. In the course of the investigation which followed, it became evident that wide variances exist in the size of SUPSHIPS and in the size, number, and complexity of the contractors with whom each must work; thus precluding such a checklist.

## B. SCOPE

The study herein, pertains only to the Supervisor of Shipbuilding and parent Naval Sea Systems Command organizations. No attempt was made to include Army, Air Force, Naval Plant Representative Office (NAVPRO), or Defense Contract Administration Service (DCAS) in the investigation, because sufficiently strong feelings exist in the shipbuilding business, that "shipbuilding is different," and therefore, what other services have done is not directly applicable. Restricting the subject to the SUPSHIPS eliminates this somewhat emotional barrier to acceptance of offered suggestions.

The problem of C/SCSC implementation will be approached from several sides. First, the organizational framework within which the SUPSHIP operates will be compared with the organizational requirements inherent in C/SCSC. Then skill and training levels required will be contrasted with those currently available at the SUPSHIPS. Additionally, NAVSEA's role will be examined along the same lines to determine how it could improve contract administration through improved policy guidance.

To look at C/SCSC in a vacuum would be to dismiss other important related factors. To avoid this pitfall, the approach taken will be broadened to include the current Department of Defense policy of "Involvement," and Navy





Procurement Directives (NPD's) related to cost monitors, overhead monitors, and subcontract surveillance which, along with DODI 7000.2, support that policy.

Other organizations, such as NAVPRO's and DCAS, were questioned, but only to the extent that was necessary to prove to the author that those organizations are "different." No attempt was made to substantiate the significance of the differences.

The DCAS is not ordinarily involved with the prime contractor on a major contract. This is not to say that DCAS does not get involved with C/SCSC, for it does, but for the most part only at the level of major subcontractors who have a flow-down C/SCSC requirement. Reference 2. describes how the DCAS organization operates to comply with DODI 7000.2.

The NAVPRO's are involved with major prime contractors in the aerospace field and have been working with C/SCSC for considerably longer than have the SUPSHIPS. Appendix A, which shows contractors and programs with validated C/SCSC systems, indicates that eighty-two of the ninety-three validations are held by these aerospace contractors and that none are held by shipbuilding contractors. Even so, interviews with two NAVPRO's left the author with the feeling that those organizations had not settled with any common workable organization. They seemed to be in the trial and error mode, looking for the proper mix of talent and the proper place in the organization for such a body to best cope with the increased involvement of DODI 7000.2.



### C. DESIGN OF INVESTIGATION

This investigation grew out of questions proposed by SUPSHIP ELEVEN in San Diego, California to the author during a visit in June 1974. At that time SUPSHIP ELEVEN, working with National Steel and Shipbuilding Co. (NASSCO), was about to become involved with the Sea Control Ship contract which included a requirement for CSCSC. The questions asked were in the following vein: "What does this clause requiring the implementation of DODI 7000.2 really mean? What types and numbers of people must I acquire to do the requirement justice? How does DODI 7000.2 relate to other requirements placed on me by Navy Procurement Directives (NPD)?" These and other questions on the subject formed the basis of this investigation. A search of the instructions, documents, and guidance available to the SUPSHIP left the questions largely unanswered.

The next step was a series of letters and telephone calls to NAVSEA to determine what information was available and to ascertain who else had been involved in implementation of C/SCSC. At that time only SUPSHIP Bath and SUPSHIP Groton were administering contracts requiring CSCSC and of the two, Bath was closest to completion of its implementation and was nearing final validation. Since no documented information existed which showed how SUPSHIPS Bath and Groton were actually attacking the problem, it was decided that a trip to each was necessary to gain the information through on-site interviews. Nearly all persons interviewed agreed that the problem was a real one and that the questions remained valid despite the progress which they had made.

Bath, being furthest along, was visited first and interviews were conducted with the Supervisor; Department Heads of Planning, Contracts, and Production Management; the New Construction Project Officer; and all personnel previously or presently assigned to the Business Review



Staff (BRS). At Groton the Business Review Staff (locally referred to as the Operations Support Group) was interviewed.

Finally, to gain insight as to the performance of the SUPSHIPS and the expectations and guidance of NAVSEA a trip to Washington was made. At NAVSEA the preponderance of time was spent interviewing members of the Contractor Performance Division (NAVSEA 054), whose task it is to implement DODI 7000.2 within NAVSEA. Further, this office arranged interviews with several other offices in NAVSEA which were involved with manpower, training, and specific projects related to C/SCSC. These offices included the SUPSHIP Management Division (NAVSEA 074), the SSN 688 project office (PMS 393), Trident project office (PMS 396), and the Patrol Frigate project office (PMS 399).

It might seem less difficult and more direct to have gleaned the information on organizational structure and responsibilities from the organization manuals of these various commands; however, it must be remembered that none of the field activities had completed validation, thus, there was reason to believe that organization manuals were not indicative of the final outcome of trials and errors made. As it turned out, this was in fact the case. Additionally, the interviews were useful in determining what future distribution of responsibility was intended, as opposed to what was currently in existence, and to what extent problems had been encountered.

The result of these interviews is an integrated look at the triad of government offices involved with administration of a major contract containing C/SCSC, the SUPSHIP, the Project Office, and NAVSEA. (See Appendix A for a list of offices interviewed.)



## II. BACKGROUND

### A. HISTORY

#### 1. Engagement Concept

The "Engagement Concept," is the policy which makes widespread use of C/SCSC possible. Evolved through the late sixties, this concept was formalized as policy in 1970 by the Secretary of the Navy. In essence this "Engagement Concept" (or Involvement Concept as it is often called) implies implementation of an aggressive Contract Administration Service (CAS) policy based on sound knowledge of the contract and the contractor. [Ref. 3,4]. It came as a result of the realization that a contractor is paid to manage his program and should be both required and allowed to do so. At the same time the government has an obligation to be prudent in the expenditure of public funds, thus requiring it to know just how these funds are being spent and what, in terms of product or progress, is being realized. The Chief of Naval Material amplified the policy by requiring vigilant review of contractors who were essentially sole-sources or who did a substantial portion of business with the DOD or who otherwise were not subject to the economic discipline of the open marketplace [Ref. 5].

The concept requires CAS personnel to become familiar enough with their contractor to be able to determine the effect of a single decision on the contractor's total performance. To accomplish this requires CAS personnel to become intimately familiar with the contractor, his organization, personalities, systems and his thinking. It does not imply government management of contractor affairs, but rather implies a close over-the-shoulder look at what the contractor is doing.





Furthermore, to think like the contractor, CAS personnel must have access to the same information upon which the contractor bases his actions and decisions.

A subsequent policy directive, DODI 5000.1, reiterates the Engagement Concept for all DOD components, and as will be shown, requires a system like the Cost/Schedule Control Systems Criteria be used as one way to implement the concept.

## 2. Evolution of C/SCSC

As early as 1950-51 the Department of Defense recognized the need for improved methods of controlling costs and of determining program progress. This recognition lead to several innovative systems or methods from the various agencies and from the programs within those agencies. Among the first was the Navy developed Program Evaluation Review Technique (PERT). Because PERT was developed by and associated with a program considered to be very successful (Polaris), it gained popularity and acclaim in military circles. Subsequently, PERT grew to have several modifications, such as PERT/TIME and PERT/COST, each an attempt to better understand program cost, schedule, and performance. Through the fifties and into the sixties, PERT dominated the scene of management information techniques; however, it was not without its faults. As each agency implemented PERT or a variation thereof, there grew a proliferation of status reports from each based on different agency requirements and in different formats. Further, many contractors were unwilling to sacrifice their own internal management techniques evolved over many years. This frequently lead to the establishment of "PERT cost groups," whose purpose it was to transpose data from the contractor's management system into PERT formats. The process was costly and resulted in some data being lost or made untraceable in the transposition. Particularly complex was the situation where one contractor had to transpose to several different



PERT formats imposed by different government agencies.

In October 1965 a working group consisting of representatives of the three military departments and staff offices of the Office of the Secretary of Defense, was formed to review existing systems and develop a framework for an integrated management information system which would satisfy the minimum requirements of program management; cost estimating, funds management, and program status.

Because of dissatisfaction with PERT a decision was made by the Assistant Secretary of Defense (Comptroller) that DOD should get out of the business of management systems design and should rely on the contractor's internal management systems. This necessitated some assurance that all contractors would integrate their data about some common baseline and that the contractors' systems would be effective for government management purposes. The Director, Defense Research and Engineering developed the common baseline in the form of a standard work breakdown structure (published later as Military Standard-881.) The assurance of effectiveness was addressed through a set of criteria which were made a requirement in 1967 through DODI 7000.2, "Performance Measurement for Selected Acquisitions." The criteria were named the Cost/Schedule Control Systems Criteria (C/SCSC) and were evolved from the Air Force Cost Schedule Planning and Control System (C/SPCS). For the purposes of this thesis it is important to note that the basis for these criteria and MIL-STD-881 was the Air Force experience over several years with aerospace contractors. In 1972 DODI 7000.2 was revised and reissued to comply with the higher order DOD Instruction 5000.1, which speaks in even greater depth to the policy of managing cost along with performance and schedule [Ref. 6,7].

Since its issuance in 1971, DODI 5000.1 has been the DOD policy document for major system acquisitions. Without referring to C/SCSC by name, it directs the use of management systems which provide information essential to



effective project management. The criteria described include: "...information should be generated from data actually used by contractor operating personnel..., in summarized form..., a single, realistic work breakdown structure..., contractor management information systems, and reports emanating therefrom, shall be utilized to the maximum extent practicable..." This is in fact a description of C/SCSC in the primary DOD policy document, and as such, constitutes recognition of C/SCSC as a highly useful technique for implementing the Engagement Concept [Ref. 8].

The objectives of DODI 7000.2 are:

" To provide an adequate basis for responsible decision-making by both contractor management and DOD Components, contractors' internal management control systems must provide data which (1) indicate work progress, (2) properly relate cost, schedule, and technical accomplishment, (3) are valid, timely, and auditable, and (4) supply DOD managers with information at a practicable level of summarization,"

while using the contractor's management control systems. The essence of the instruction is that it sets forth a criteria for judging the effectiveness of such systems. No new system is required, nor are any reports required. For this reason C/SCSC will differ in every company in which it is implemented. This is a critical point to the contract administrator for it makes it clear that to be effective he must understand his contractor's systems. He can call on no expert to quickly evaluate his situation. C/SCSC is only as valuable as the administrator's knowledge of his contractor is thorough.

-----  
DOD Instruction 7000.2 "Performance Measurement for Selected Acquisitions," April 25, 1972.



The government utilizes C/SCSC to gain the required visibility into a contractor's operations, through a three-phase process; Implementation, Surveillance, and Analysis.

NAVSEA and SUPSHIP experience since the PF contract was awarded to Bath Iron Works in April 1972, has been associated primarily with the Implementation phase. Three years later, no shipbuilder has yet become involved to any significant extent in the latter two phases. While the intent of C/SCSC is to use existing contractors' systems without change, except where necessary to meet the criteria, experience to date indicates that the systems used by shipbuilders do not meet the criteria and do require substantial modification. The fact that the criteria were developed with the aerospace industry in mind may account in part for the difficulties encountered by shipbuilders in implementation when contrasted with the widespread success enjoyed by aerospace firms and their contract administrators. Nevertheless, implementation has been an arduous process and a real bone of contention between contractor and government where ships are involved.

The Implementation Phase consists of a series of reviews (See Fig. 1. for a pictorial display of the relationship between C/SCSC phases and reviews.) The first is a Pre-award Evaluation consisting usually of a presentation by the contractor of the systems he proposes to use to satisfy the requirements outlined in the Request For Proposal (RFP.) The objective of this evaluation is to gain assurance that all parties fully understand that which is required by the criteria, and to determine in gross terms the extent of work still necessary to achieve compliance.

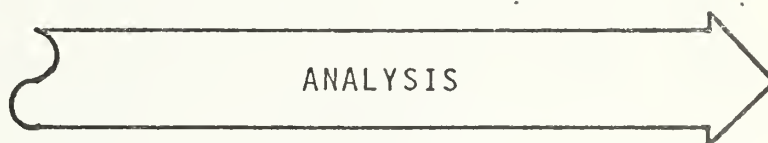
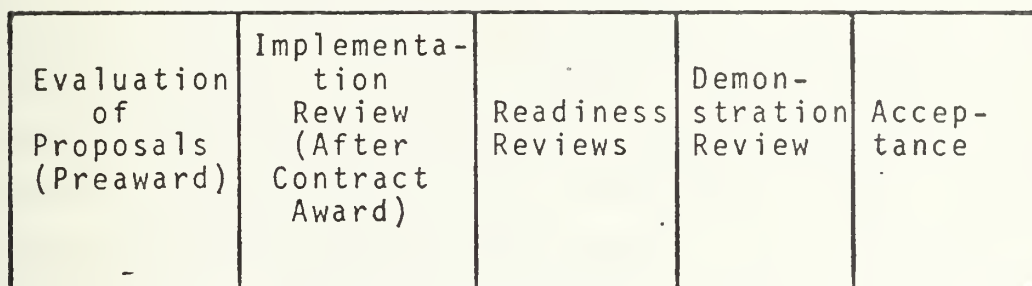






FIGURE 1

THE C/SCSC PROCESS





As soon as possible after the contract is awarded, an Implementation Review is performed. This review looks closer at the contractor's proposed systems, systems designs, data, and reports. Systems already in operation are examined in-depth and discrepancies are noted. The visit provides an early dialogue with the contractor to identify problem areas and to establish a schedule for subsequent reviews.

The third review is actually a series of Readiness Reviews. Here progress is evaluated and contractor systems traced through in great detail. These Readiness Reviews provide further familiarization with the systems in use and provide a last chance for the contractor to make adjustments and refinements before final review. An individual system successfully demonstrated during Readiness Reviews may be conditionally validated, the condition being that the system continue to work properly when integrated with all other systems.

Lastly, a final Demonstration Review is conducted. All systems are measured, separately and as integrated parts of a whole, against the C/SCS Criteria. Complete systems descriptions, documentation and reports are provided to the government for scrutiny. A successful demonstration earns the contractor a validated system and a Memorandum of Understanding that his systems meet the needs of the DOD. The need for subsequent reviews to satisfy other DOD components or for other contracts is obviated.

The entire review process constitutes an orderly yet increasingly detailed look at the contractor, his philosophies, and his methods. These management systems, once demonstrated/validated, provide a common source of data and a common methodology through which both government and contractor can control funds, estimate costs, and interpret program status [Ref. 7].

The team which conducts these reviews at a shipbuilding contractor is made up of personnel from



Headquarters. Naval Material Command (NAVMAT), NAVSEA, SUPSHIP, and the Defense Contract Auditing Agency (DCAA). NAVMAT, who has final authority within the Navy to approve a contractor's system, participates in all but the Readiness Reviews, and provides the Team Director, a GS 16 Business and Industrial Specialist. NAVSEA participates in all reviews and provides a GS 15 Business and Industrial Specialist as Team Chief, along with two or three other similar specialists at the GS 15/14 level. The SUPSHIP participates in all reviews utilizing whatever talent he has available. DCAA also participates in all reviews and provides as necessary from one to six or eight auditors. Interviews with NAVSEA personnel indicated that NAVMAT and NAVSEA fairly well dominate during the first two reviews, with SUPSHIP personnel "catching-up" and achieving greater participation during readiness and final demonstration reviews.

To better understand exactly what this team does during the various reviews during implementation, it is necessary to look first at the C/SCS Criteria. Appendix F, an extract from the Joint Implementation Guide, describes the thirty-five criteria and serves as the checklist used by team members during a contractor review. This checklist shows what must be demonstrated and some of the specific questions which must be verified by team members.

Knowing what reviews are conducted and what questions are addressed during the reviews, there remains the question of what skills are needed by team members to fully comprehend the criteria and the shipbuilder's systems. The criteria are flexible and allow for substantial interpretation and judgement. The Joint Logistics Commanders, including the Chief of Naval Material, set down standards of skill and knowledge necessary to the successful implementation of C/SCSC. They are as follows:

Technical content of the contract - Knowledge of the specific requirements of the contractual document including



the intent and reasoning behind individual clauses and specifications.

Engineering design and test requirements - Particularly true with design and development contracts, the team must have an understanding of what it is that is being designed, even when the object is still in its conceptual stage. One must understand the engineering processes used to bring a concept to reality and hardware and how test requirements are established as criteria for measuring progress.

Industrial engineering and production control - One must understand the methods used in production and understand the inherent efficiencies and disadvantages of these methods. He must be able to relate the methods being utilized to an actual time schedule and be aware of the interdependencies of the various elements of the production process as they relate to cost and schedule.

Accounting or auditing - One must be able to understand the contractor's accounting system including his accumulation and allocation of costs of labor and materials for a given contract and plantwide allocation of indirect costs. Additionally he must understand contractor internal controls designed to safeguard assets.

Program planning and control - One must understand time and cost budgeting, the methods by which the contractor plans his work and what systems are used to provide feedback as measures of conformance to original plans.

Cost and Price analysis -The ability is needed to independently price work packages and to measure accuracy and adequacy of contractor costs and allocated budgets in order to determine the adequacy of budget baselines.

Contract negotiation and administration - One must know in both an informal sense and in a legal sense how the contract was arrived at and how changes to it will be handled. A knowledge of how the contractor subcontracts for parts of the system must be understood.





The aforementioned skills represent the skill standard outlined by NAVMAT. There is one area not covered by this standard but which is of vital interest in shipbuilding. Ships by their very nature are the most complex of weapon systems, usually requiring the integration of several lesser but still major systems, such as guns, missiles, torpedoes, and aircraft. This complexity together with the fact that building a ship is more of a construction problem than a production or assembly problem, heightens the need for knowledge in material control systems. Added to the list of required skills should be: Material control systems - A knowledge of the contractor methods of determining material requirements, purchasing, storing, and material allocation, to include both contractor furnished and government furnished materials.

In the area of training, the Guide sets a standard that "All members should receive specialized training dealing with management control system concepts, and performance requirements and interpretation prior to participation as team members." Specifically, the training necessary includes study of work breakdown structures in accordance with MIL-STD-881, an in-depth analysis of the Criteria and interpretation of the Criteria conducted within a framework established by DOD policy, the functions of planning and control systems for both research and development and production type contracts in terms of budgets planned, measurement against the plan, and actual costs as viewed by both contractor and government. The study should also include techniques of sampling and methods of analysis which are necessary for determining the extent of compliance of a contractor's systems. Aside from criteria and methods of implementation, training is needed on actual management systems to enable future team members to zero in on key control points in a system and points where interdependencies are established making one system sensitive to elements of another system. Team members must



thoroughly understand the concept of the budget baseline as used in C/SCSC, including budgeted cost of work scheduled and budgeted cost of work performed.

With this as a training standard, the Guide recommends the Air Force Institute of Technology (AFIT) course, "Evaluation of Performance Measurement Systems." This three week course looks in-depth at the criteria and interpretations thereof, and then uses about one-half of its class time in problem solving with management systems [Ref. 9]. While this course does not attempt to impart the functional skills required, it does present fully the necessary skills and knowledge specifically related to C/SCSC. As such, it satisfies the standard for C/SCSC training. The functional expertise must be acquired by experience and schooling through courses available for each of the respective disciplines.

Although the Navy does not yet offer a course on C/SCSC, there are several courses offered by the Air Force and Army on specific aspects of the criteria. AFIT offers a two week course addressing the surveillance function and the Army Management Engineering Training Agency offers a two week course on the analysis function. In addition the Defense Systems Management School offers two shorter overview courses for middle and higher level managers. The recommended three-week course at AFIT is the only one available which concentrates on the implementation function and the review process. The course not only addresses the training skills required, but also well-serves a contract administrator during surveillance. (See Appendix B for a list of C/SCSC schools available.)

The last two phases of C/SCSC, Surveillance and Analysis are less complex. The Surveillance phase starts at contract award and continues thereafter. Although overlapping in time with Implementation and Analysis, this phase is different in nature. It includes the monitoring process. The contractor's systems are periodically reviewed



and tested to ensure that they operate as intended and that no changes in the systems or their use have occurred which negate the original validation. The purpose here is to ensure that the data base remains consistent. This assures that both DOD and the contractor have a common zero point from which to form their independent evaluations of progress and cost to complete. The knowledge required here need not be as in-depth as was necessary during implementation, for rather than than having to start with nothing and familiarize themselves with several sub-systems, those charged with surveillance start with complete systems descriptions.

The Analysis Phase starts as soon as contractor systems start to produce reliable data. It is the process of comparing actual to planned progress. During this period SUPSHIP personnel must have knowledge of contractor systems equal to that required during implementation. Both the Joint Implementation Guide and the Joint Surveillance Guide recommend that the same personnel be utilized to do both the implementation and analysis [Ref. 1,10]

A sizeable part of the analysis task is mathematical. While the Air Force has progressed to the use of computerized programs for analysing C/SCSC data, NAVSEA has not reached that stage. The output of the contractor's systems is data summarized at appropriate levels, in the form of variances between actual costs of work performed and budgeted costs of work performed. There are no fixed rules as to what variances are significant. Those charged with analysis must look at each variance, determine if it is significant, and then trace backwards through the systems to analyse trends and locate trouble sources. C/SCSC guidance refers to a Memorandum of Agreement between the Project Office and the SUPSHIP, outlining the extent to which the SUPSHIP will be responsible for this analysis phase of DODI 7000.2 [Ref. 1]. All three of the projects associated with C/SCSC at the SUPSHIP indicated that they expected the



SUPSHIP to do all required analysis, as the office in the best position to make meaningful judgements of progress.

Figure 2. shows an example of the complexity of systems which go together to make up the Cost/Schedule Control System of one major U.S. shipbuilder. To understand thoroughly any such array of systems requires the talents of several disciplines. Some would fall within the realm of industrial engineering, others within accounting, logistics, purchasing, contracts, etc. For any one discipline to do justice to all systems would require either exceptionally broad, talented people or a substantial period of interdisciplinary training. As a minimum, a SUPSHIP administering a major contract with C/SCSC as a requirement should have the following personnel dedicated to the C/SCSC function:

Industrial Engineer

Procurement Analyst

Management Analyst

Materials Specialist

Cost/Price Analyst or Cost Accountant.







FIGURE 2.

EXAMPLE OF C/SCSC SUBSYSTEMS

COST ACCOUNTING SYSTEM

CONTRACT LABOR AND MATERIAL BUDGETING SYSTEM

OVERHEAD BUDGETING AND CONTROL SYSTEM

PROGRAM ANALYSIS AND REPORTING SYSTEM

SHIPYARD DIRECT LABOR COST CONTROL SYSTEM

SHIPYARD DIRECT LABOR BUDGETING SYSTEM

MASTER PLANNING AND SCHEDULING SYSTEM

NEW CONSTRUCTION WORK AUTHORIZATION SYSTEM

MANUFACTURING PRODUCTION CONTROL SYSTEM

MATERIAL CONTROL SYSTEM

INVENTORY CONTROL SYSTEM

PROCUREMENT COST/SCHEDULE CONTROL SYSTEM

CONTRACT CHANGE CONTROL SYSTEM



In the course of this investigation it became very clear that the way business is conducted within the Navy is not always based on any logical and rational decision process, but sometimes is the result of an ingrained parochialism and a reluctance to change. The following quotes, purposely unattributed, were made by high level, influential persons during interviews conducted: "C/SCSC is an industrial engineering function." "This is what industrial engineers do best." "Any industrial engineer worth his salt can handle this." A quick look into the background of these persons indicated that they had worked extensively as industrial engineers, were industrial engineers by education, or both. Another glance at the skills required and Fig. 2., which shows the systems one might encounter, will show that C/SCSC is not totally an industrial engineering function. An example would be the Procurement System. Although the industrial engineer may in the course of his education take courses in procurement systems, more than likely his depth of knowledge in the area is not significant. The multitude of requirements which are government-specific, such as special clauses in Armed Forces Procurement Regulations pertaining to the Small Business Administration etc. are not normally the bailiwick of the engineer. An introductory knowledge or a cursory familiarization with the subject is not sufficient if government is truly to become involved or engaged with the contractor. Further, if such engineers do exist with the knowledge and experience to monitor, understand, and evaluate the depicted control systems, they are not available for hire at the GS 9-12 level. It is not intended to down-play the industrial engineer for he is probably one of the most important members of the implementation team. He would be most knowledgeable in the systems for production control, work authorizations and direct labor. On the other hand, a materials specialist would be valuable for material control, inventory control, and procurement systems, and the



accountant valuable for cost accounting, overhead budgeting, and direct labor, etc. The point being, that such systems are not the exclusive domain of any single discipline, and to summarily assign C/SCSC as a package to an industrial engineering element may deprive the Supervisor and Project Manager of a substantial amount of relevant expertise and advice.

## 2. Role of the SUPSHIP in C/SCSC

During the era of firm-fixed-price contracting the SUPSHIPS had no real incentive to closely monitor contractor costs. Their efforts were, therefore, appropriately directed to ensuring that the government received a quality product at the appointed hour. Involvement with costs were to the extent necessary to price out changes, make progress payments, and to settle claims. The SUPSHIP organization evolved to reflect this emphasis on performance and schedule. The percentage of personnel involved directly with the costs or business aspects of contract administration has been, and remains, small. For example, while approximately 70% of acquisition dollars are expended in subcontracts and overhead, less than 2% of field contract administration personnel are involved in monitoring these costs [Ref. 10].

It was not through any shortcoming on the part of the SUPSHIP that this situation developed, for the SUPSHIP's mission did not include emphasis on the business aspects of involvement. It was policy at the time that the internal management control systems of a contractor were not the proper concern of the Navy. It was policy to allow the contractor to suffer the penalties of inefficiencies in his operations [Ref. 3]

The SUPSHIP organization responded to this disengagement policy and evolved naturally to emphasize schedule and quality. Figure 3. shows the distribution of personnel among the various departments at the three largest



SUPSHIPS, Newport News, Pascagoula, and Groton. The size of the Quality Assurance (Q/A) department (performance oriented) and the Planning department (also performance oriented) are indicative of the extent to which this emphasis has effected SUPSHIP manning. The personnel in Q/A are generally Q/A specialists and shipwork inspectors. The Planning department is more engineering oriented and contains engineers and technicians in the various engineering disciplines.

During the late sixties, the momentum of the Engagement Concept constituted a change in mission for the SUPSHIPS. The implications of this new mission have not yet been fully realized, but it is clear that the SUPSHIPS have not kept pace with the shift in emphasis (The distribution of Fig. 3 represents SUPSHIP manning in 1975.) The additional change away from the firm-fixed-price contract and towards cost and incentive contracting has further intensified the need for SUPSHIPS to become more cost conscious, because under these type contracts the government must now bear the major share of cost risk.

In 1970 NAVSEA, then NAVSHIPS, decided to alter the standard organization by selective authorization of a Business Review Staff (BRS). In a Decision Paper entitled "Business and Financial Management in SUPSHIPS," this staff was authorized specifically to add emphasis and talent to the SUPSHIPS in order to increase expertise and talent in the cost vice technical area, and to develop a cost analysis independent of DCAA. However, the BRS was authorized in only the three largest SUPSHIPS, Newport News, Pascagoula, and Groton. As envisioned, the staff would consist of a Supply Corp. Lieutenant Commander, postgraduate trained, a GS 13/14 Management Analyst, a GS 12/13 Financial Manager, and a GS 12/13 Industrial Engineer. A similar staff was also to be formed in NAVSEA, consisting of three financial analysts and an industrial engineer.





FIGURE 3

SUPSHIP PERSONNEL DISTRIBUTION

SUPSHIP	Command/ Staff	Admin.	Planning	Q/A	Contracts	Materials	Prod. Mgt.	Repair
GROTON (1)	35	19	79	103	37	45	19	28
PASCAGOULA	44	43	62	71	35	52	41	10
NEWPORT NEWS	80(2)	38	87	112	37	56	65	--
TOTALS (3)	159	100	228	286	109	153	125	38

Notes: (1) Groton distribution does not include thirty-five military personnel.

(2) Newport News Command/Staff includes Repair personnel.

(3) Where the Production Management Department is not authorized, the majority of its personnel would be distributed among Q/A and Planning departments.



The emphasis of the BRS was clearly on the business and financial aspects [Ref. 12]. When Bath Iron Works was awarded the Patrol Frigate development contract, SUPSHIP Bath joined the "big three" to make it the "big four" and was authorized also to establish a Business Review Staff. This authorization was a NAVSEA initiative, not the result of a SUPSHIP request, for no published criteria existed, in the form of thresholds or otherwise, which would make a SUPSHIP automatically eligible at some point for such an augmentation.

Not until 1973 was any SUPSHIP organizational change issued which specifically recognized and assigned the responsibility for C/SCSC surveillance. A new Production Management Department (code 600) was provided for, which, with one exception, was only a realignment of existing divisions (see Figure 4.). The notable exception, was the Production Engineering Division (PED), tasked with C/SCSC surveillance and analysis, and several other areas including; safety, docking, facilities and industrial engineering efficiency checks [Ref. 13]. Those tasks other than C/SCSC were previously spread throughout the SUPSHIP organization. (Appendix F fully describes the PED functions.)

Unlike the BRS, the Production Management Department is authorized at a SUPSHIP upon his attainment of a certain threshold, \$50 million or more in cost and incentive contracts with a single contractor. This dollar level ensures that any contract requiring C/SCSC also authorizes the organizational change. To date, the same "big four" have established or are in the process of establishing the new department. Newport News has since requested and been granted permission to disestablish the new PED because it has no C/SCSC contract in being [Ref. 14].



ORGANIZATION OF THE OFFICE OF SUPSHIP





### 3. Related Requirements Placed On The SUPSHIP

In its effort to instill a business awareness in its contract administration activities, and to further implement the Engagement Concept, Headquarters, Naval Material Command (NAVMAT) has recently issued a series of Navy Procurement Directives (NPD) compelling a closer look at contractor costs. These NPD's are not specifically aimed at C/SCSC, but are so closely related, even overlapping, as to be inseparable in practice.

NPD 20-702.5 requires each SUPSHIP to establish a Cost Monitor, either an individual or an organizational element, to monitor all contractor costs. Among the functions of the monitor are, representation on demonstration reviews and maintenance of surveillance in connection with C/SCSC. The NPD specifically suggests the Business Review Staff, where authorized, to perform these functions [Ref. 15].

NPD 23-108 requires the SUPSHIP to establish a Subcontract Surveillance Program and to assign the responsibility to an individual. To ensure that such a program is properly drawn and carried out, NPD 23-101.1 directs the Contractor Procurement System Review (CPSR) team to review not only the contractor, but also the SUPSHIP surveillance program [Ref. 16,17].

Lastly, a new NPD is in the process of being drafted to require SUPSHIPS to have an individual assigned as an Overhead Monitor. This program is the result of a Logistics Management Institute study and SECDEF guidance already distributed to SUPSHIPS for information [Ref. 18,19].

Cost monitoring, overhead monitoring, and subcontract surveillance are all, to some extent, elements of any C/SCSC program, and it seems unnecessary, even wasteful, to have separate programs and monitors for each.





## B. CURRENT SCENARIO

As of this writing, SUPSHIPS Bath and Groton are the only two who have made any significant progress in DODI 7000.2 implementation. Bath Iron Works, after nearly three years of effort, has demonstrated completion of all requirements of C/SCSC and will be the first shipbuilder to have its system validated. With award to Lockheed of a contract to build two submarine tenders (AS 39/40), SUPSHIP Thirteen has recently become the third to have to deal with these problems, but has not yet decided just which approach it will take. SUPSHIP Eleven, the catalyst for this study, has since been relieved of the necessity of implementing C/SCSC, as the Sea Control Ship goes unfunded. Newport News and Pascagoula each have Production Management Departments and Business Review Staffs, but no C/SCSC contract. All SUPSHIPS are presently wrestling with the responsibilities placed on them by the new NPD's.

During the Implementation phase with all of its reviews, the proper skills are made available. Where the SUPSHIP is deficient, NAVMAT and NAVSEA supplement the team. During the later phases, such supplemental expertise will not be available and the SUPSHIP will have to have the needed skills within his own organization. Viewing C/SCSC as a continuing process rather than a one-time implementation, points then to a period of development and transition for the SUPSHIPS, during which guidance and standards are needed.

Although there has been a reluctance by shipbuilding contractors to accept C/SCSC, this reluctance is breaking down as more and more contractors are reporting successes as a result of implementation. The trend now is toward wider use of newly developed management systems on programs where there is no formal requirement. Electric Boat would like to try C/SCSC on a major repair or overhaul contract, and Litton has requested that its systems at Pascagoula be



validated even though no present contractual requirement exists. This growing interest constitutes acknowledgement by the shipbuilding industry that C/SCSC has become a fact of life.

Those SUPSHIPS and contractors who have not had to face up to C/SCSC are watching carefully the experiences of Bath and Groton, a description of which is included in the following chapter.



### III. DISCUSSION

In the following discussion SUPSHIPS Bath and Groton will be examined in light of current policy. The approach taken by each will be described and compared to this policy and to C/SCSC as it was intended. The personnel and skills utilized in C/SCSC implementation will be measured against the skills described as necessary by the Joint Logistic Commanders. Variances from policy and guidance, previously discussed, will be looked at in light of the situation and problems encountered by the SUPSHIPS.

To the extent that NAVSEA guidance to the SUPSHIPS impinges upon their actions, the role of NAVSEA will also be examined.

#### A. SUPSHIP BATH

##### 1. Organization

SUPSHIP Bath has been administering since April 1972 the Patrol Frigate contract with a C/SCSC requirement. The Supervisor's organization manual assigns full responsibility for C/SCSC to the Production Engineering Division; however, the PED is not adequately manned to assume the task. The PED was not authorized until September of 1973, months after contract award, and was therefore not available to participate in the C/SCSC reviews. The BRS was not authorized until May 1974, and it likewise was not available. Forced with the need to implement DODI 7000.2 upon contract award, the Supervisor was left with few organizational alternatives to get the job done. He chose an ad hoc "task group approach."

The Supervisor, himself, along with the PF Project Officer (both military), and other key personnel from his



functional codes, made up this task group. Over time the Supervisor gradually relinquished his part of the effort to other team members. The resultant group, assembled to implement C/SCSC, consisted of about five people, each with C/SCSC as an additional duty.

As BRS personnel were hired they were utilized during the latter part of the implementation phase, but primary responsibility remained with the task group. Another reason why the BRS did not get assigned C/SCSC responsibility was the fact that it has not yet stabilized. The staff supervisor has been moved to the contracts department and the supervisor billet remains vacant. The Contracts Officer presently double-hats as the head of the staff. The Procurement Analyst position was filled but subsequently vacated.

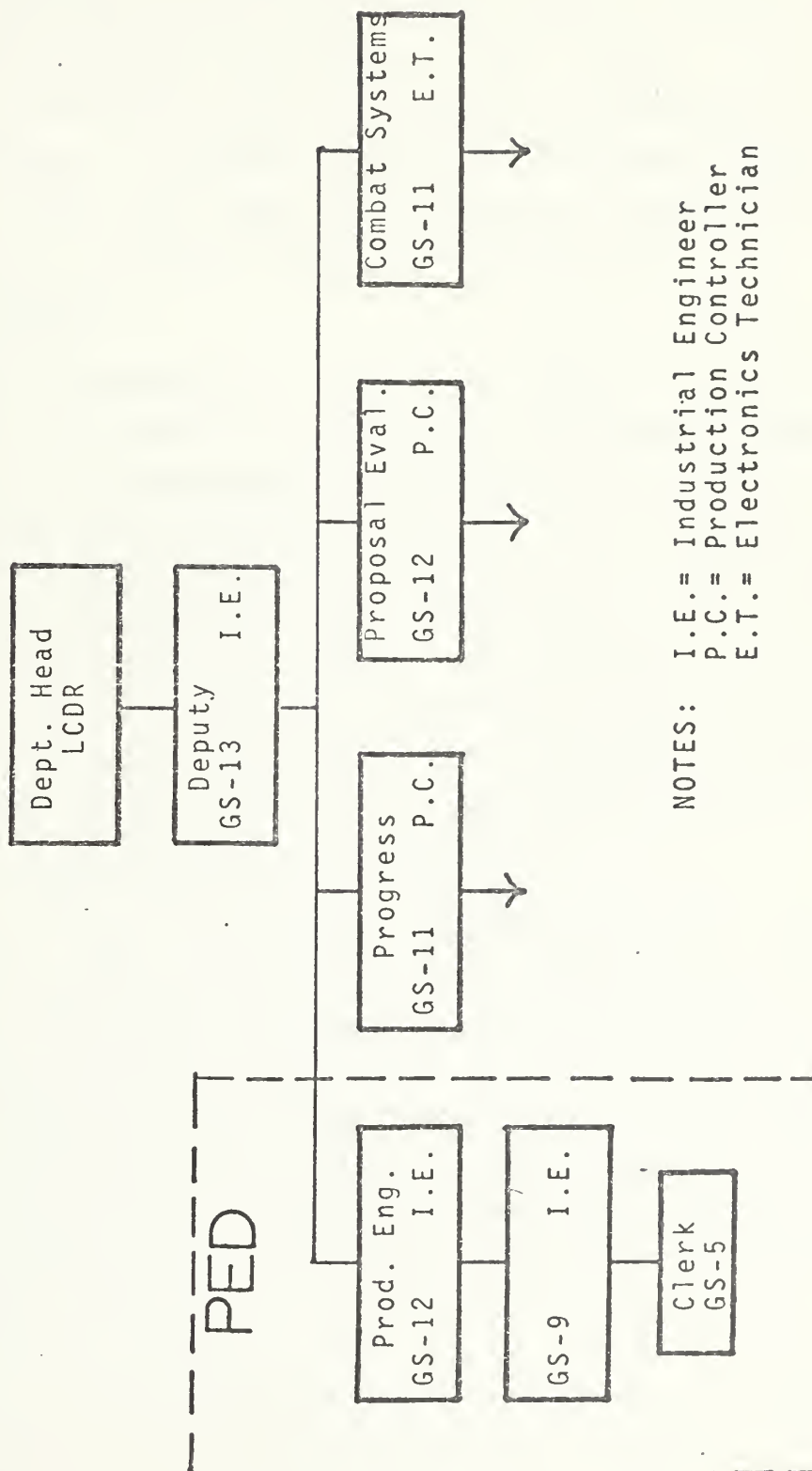
The PED like the BRS has not stabilized enough to take on C/SCSC responsibility. The Supervisor still intends to transfer this responsibility to the PED as soon as he can. The intended organization of the Production Management Department is as shown in Fig. 5. The PED will consist of two industrial engineers and a clerk. It is intended that these engineers will task other departments for assistance in those areas where their expertise is inadequate. The Supervisor intends to use the BRS as his personal staff to which he can assign problems for staff study. Because the BRS at Bath has not been, and is not, intended to be used for C/SCSC, it will be only briefly described. Intended were a Business and Industrial Specialist at GS 13, a Procurement Analyst at GS 12, a Cost/ Price Analyst at GS 12 and a Staff Accountant GS 12. Only the latter two are presently filled.





FIGURE 5

PLANNED BATH PRODUCTION MANAGEMENT DEPARTMENT



NOTES: I.E.= Industrial Engineer  
P.C.= Production Controller  
E.T.= Electronics Technician



## 2. Personnel

In the PED, the Supervisor intends to have a GS 12 and a GS 9 industrial engineer. The GS 12 has not yet been filled. Available to augment this division when necessary will be the deputy department head (600b), a GS 13 industrial engineer with some previous experience in C/SCSC while at Groton. Actually the Deputy Department Head was hired to head the PED, but in order to justify the GS 13 grade level, the deputy billet was established.

## 3. Training

The Supervisor at Bath, in order to bring his people up to speed on C/SCSC did send three personnel to AFIT, one to the recommended three-week course, and two to the two-week surveillance course. Later he realized that the personnel he had sent to school were, for other reasons, not the ones he wanted on the implementation team. None of the personnel who actually participated in the implementation and validation effort had attended any school on the subject. Bath personnel were therefore unable to make judgements as to the value of available training.

## 4. Handling of Related Requirements

The NPD established requirements for cost and overhead monitors and subcontract surveillance have all been assigned to the BRS which presently consists of two people. The Cost/Price Analyst handles the cost monitoring, and a former DCAA auditor, now Staff Accountant, handles overhead. The BRS is not presently manned to handle subcontracts and procurement methods; therefore, subcontract surveillance in reality falls out of the BRS and into the Contracts Department.



## 5. Advantages and Disadvantages

There are advantages to the approach and philosophy of SUPSHIP Bath. The task group or project approach to C/SCSC implementation draws from existing resources, key personnel and assigns them the responsibility. The process is expedient. The time required for organizational set-up, familiarization, hiring, and training is saved. The hiring and training alone could conceivably take years. His use of military personnel may have brought to the task group a wider breadth of knowledge across the contract administration spectrum, at the expense of detailed functional expertise.

The disadvantages are more extensive. First, the additional task may detract from previously assigned primary duties, particularly in the case of the Supervisor and the project officer. Utilizing key military people during implementation may cause problems downstream during surveillance and analysis due to a lack of continuity. The knowledge of the contractor gained during validation may be transferred with them. A major disadvantage seems to be the possibility that the proper talent and expertise might not be available within the SUPSHIP's organization to form such a task group. Military officers, generally from the 1400 community, with years of excellent service in their field but without a substantive business or financial background might not be appropriate members of a group dedicated to the understanding of a contractor's management control systems. The lack of schooling may lead to spending unproductive time and effort in a trial and error effort to learn. The lack of a formal organizational element responsible for C/SCSC may lead to insufficient attention to the task at hand by task group members when other urgent matters loom. The Supervisor's intention to ultimately shift all responsibility to the Production Engineering Division will alleviate the latter disadvantage, but the PED is not, after



two years, manned, and when manned will be made up of only industrial engineers. Thus, many of the disadvantages will remain.

## B. SUPSHIP GROTON

SUPSHIP Groton first became involved with C/SCSC with award of the SSN 688 contract in November of 1973, and subsequently with Trident design and lead-ship contract. The major difference between Groton and Bath approaches is that Groton had a BRS already authorized and functioning before award of contract. This fact made it easier for the Supervisor to handle the new requirement largely with existing assets.

### 1. Organization

Groton, as stated earlier, has both a BRS and a PED. Each is a manned and functioning element of the organization. The BRS, or as it is locally known, the Operations Support Group maintains overall responsibility for implementation and analysis phases and provides the overview and coordination where the program crosses organizational boundaries. The command's view of the BRS is that it should:

"provide the Supervisor with a nucleus of expertise in business, financial, and operational management concepts/procedures which can be utilized to focus on problem areas which are: (1) broader than the scope of any one Department/Staff, or (2) of such depth as to require an effort greater than that which any one Department/Staff could support."

In actuality, this description of the ERS function is exactly in line with the thinking and intent of the NAVSEA

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SUPSHIP Groton Organization Manual, SUPSHIP  
Instruction 5450.2, p.3, 1 July 1974.





personnel who pioneered BRS authorization . The scope of C/SCSC is such that it meets these criteria for assignment to the Groton Business Review Staff. While the staff is manned to do the necessary analysis, it is not capable of performing all of the necessary surveillance. To accomplish this, the staff maintains the total responsibility while tasking the various functional departments to perform surveillance of certain subsystems according to a Surveillance Plan. The PED is one of the divisions tasked by BRS to do surveillance, particularly in areas related to engineering and production.

## 2. Personnel

The BRS at Groton is staffed by a LCDR (SC) supervisor with a staff of seven men. Six of the seven staff members are at the GS-13 level and one is a GS-11. The expertise includes: a systems analyst, financial analyst, procurement specialist, materials specialist, and an auditor. Less emphasis was placed on the Civil Service classifications of personnel hired than on the experience and knowledge of how the shipbuilding industry operates. By way of example, Groton indicated that if in search of a man to serve on the staff to monitor contractor procurement methods, the order of preference would be; first, someone who was familiar with Electric Boat procedures; second, someone who was familiar with procurement procedures in the shipbuilding industry in general; third, a Civil Service designated Procurement Methods Analyst or Procurement Analyst. Also , prior knowledge of C/SCSC was not a major criteria.



### 3. Training

Only one member of the staff has attended the recommended three-week school, but all members have developed some knowledge of the Criteria via on-the-job training. The one man who had attended school has become one of C/SCSC's most avid salesmen. Unable to schedule convenient school classes, the Supervisor has arranged to bring C/SCSC instructors to Groton from Wright-Patterson during September of this year where he expects to be able to educate some twenty-five people at once. Air Force Institute of Technology, School of Systems and Logistics at Wright-Patterson Air Force Base can provide this service, although it is not their normal procedure and they do not advertise the fact.

### 4. Handling of Related Requirements

The BRS is in the process of being reorganized to bring together all of the recent requirements for monitors into a centralized monitoring function. The BRS will have the responsibility for the monitoring effort while each of the departments is tasked with monitoring those contractor systems which fall within their respective areas. For example: Electric Boat's Direct Labor Cost Control System falls in the area of production/industrial engineering and therefore, may be assigned to the PED. The BRS has the expertise to plan, coordinate, and evaluate the PED effort. The monitoring effort of these related requirements is done in the same fashion as with C/SCSC, in that, the BRS has the responsibility and does as much of the monitoring as is practicable and tasks the departments with the remainder.



## 5. Advantages and Disadvantages

The advantages of Groton's approach are significant. First, it does bring to the SUPSHIP increased business and financial expertise, enabling him to effectively monitor costs. It integrates the C/SCSC monitoring effort with other related monitoring requirements. It assigns responsibility to one element, with the necessary skills at hand, decreasing the chance that some part of the program will be overlooked or "fall through the cracks." It has long range stability as it aims more at knowing the contractor rather than being aimed at a given contract. It is a primary duty of an organizational element, thus reducing the chance that it will be forsaken when crises arise, as might be the case were it a secondary or collateral duty.

The disadvantages are: First, It assigns to a staff, responsibility over line elements. This point was brought to the author's attention by a member of the PED who had been made accountable to the BRS and was not happy about it, pointing out the fact that variations from perfect line/staff relationships can have side effects. This approach requires additional people and perhaps additional ceiling points. Lastly, recognizing that these are essentially new skill requirements for the SUPSHIPS, it is a time-consuming process to develop a staff of the right people for such an undertaking.



### C. THE NAVSEA ROLE

The SUPSHIPS are not centrally managed and administered within NAVSEA. They receive direction and resources from several NAVSEA offices. NAVSEA (07) is the Field Activities Directorate and NAVSEA (074) is its SUPSHIP Management Division, tasked with administering the organization, manpower, and training needs of the SUPSHIPS. Prior to a reorganization of NAVSEA, which brought the field activities under one directorate, the SUPSHIP management Division was under the Production Directorate as NAVSEA (052). Performance Measurement and C/SCSC responsibility were assigned also under Production in (054). With the reorganization the SUPSHIPS and control of SUPSHIP resources became (074), but C/SCSC remained under Production. The situation now has (054) placing requirements on SUPSHIPS while (074) controls the resources. For example; If a SUPSHIP were to request from NAVSEA authority to establish the Production Management Department, the request would go to (074). Not really familiar with the actual workings of C/SCSC, (074) would send the request to (054) for comment. The decision to allow the new department would actually be made by (054). Then (074) would make the decision on the extent to which it could provide the resources. The result is a situation of fragmented management of the SUPSHIPS. No one office has both knowledge of the personnel and skill requirements of the SUPSHIPS and control of the resources to meet those requirements.





## 1. Organization Suggested

From the instructions, directives, and policy guidance which have been promulgated throughout the DOD and the Navy [Ref. 8,20], it seems clear that attention to the business aspects of contract administration is what is needed in the Navy if it is to comply with existing policy directives. In its suggested organization NAVSEA assigns C/SCSC responsibility to the Production Engineering Division [Ref. 21]. NAVSEA's primary concern is that the job get done, the organization used to accomplish this end being only of subordinate interest. Since only four SUPSHIPS have a BRS, it was not possible for NAVSEA to suggest assignment of C/SCSC to such a staff unless NAVSEA was willing to authorize a BRS at all SUPSHIPS administering a major contract. Additionally, it is felt that assignment of such responsibilities to a staff would cause it to cease being a staff function, the thought being, that continuing efforts belong in the functional organization and not to a staff. One other aspect was clear; that C/SCSC belonged more to the realm of industrial engineering than to any other discipline and ; therefore, should be assigned to an industrial engineering element. In summary: it could not go to a staff; it had to go to a line element; it should be an industrial engineering element. So goes the reasoning behind the PED. In light of the previously discussed requirements for C/SCSC analysis alone, the PED is assigned a formidable responsibility.

The fact that NAVSEA through its organization manuals has pretty much dictated the approved organization of its field activities, has been the subject of some discontent on the part of the SUPSHIPS. They have expressed a desire to organize as they see necessary to best perform their functions. A study of the matter by Logistics Management Institute concurred [Ref. 22]. In response to this desire for increased flexibility, NAVSEA is in the



process of issuing a new instruction promulgating an organization manual for the SUPSHIPS which will delete the organizational sections of the Ship Acquisition Contract Administration Manual (SACAM) and the Ship Repair Contracting Manual (Repair Manual.) The impact of this instruction may well be to give the Supervisors the authority and flexibility to organize to accomplish the tasks as they see them, keeping NAVSEA informed [Ref. 23].

To date NAVSEA's guidance to the SUPSHIPS has been in the form of authorizations for organizational change. No guidance has been promulgated which addresses how the SUPSHIP is to go about accomplishing the new requirements in terms of skills required to effectively manage multi-million dollar programs.

## 2. Personnel Policies

The SUPSHIP Management Division of NAVSEA (code 074) administers personnel resources at the SUPSHIP. Within its allotted ceiling points, increases in manning levels are authorized on a case basis to field activities. As is the case throughout the DOD there are pressures to keep manning levels low and further, to keep grade levels as low as possible consistent with the needs of the Department [Ref. 24]. "Grade creep," as it is known, is an area of major concern in government. In this environment NAVSEA must be judicious in the assignment of increased ceiling points, and stand ready to justify its actions.

Aside from the management problems inherent in the NAVSEA organization, a part of the problem is SUPSHIP generated. A review of correspondence between the SUPSHIPS and NAVSEA concerning requests for additional ceiling points associated with receipt of a C/SCSC contract clearly indicated either lack of knowledge or lack of interest on the part of SUPSHIPS. Thoughtful justification for new personnel is not conveyed. Ceiling points authorized vary considerably from those requested. As an example, one



SUPSHIP, upon receiving a major contract to administer, requested an additional sixty ceiling points specifying only that the breakdown would be a certain number to each of his departments. No indication of the types of skill shortages or estimated utilization of these sixty persons accompanied the request. NAVSEA's reply was authorization of twenty ceiling points. Without doing any sort of mathematical analysis, it did appear that those who justified their requests fared better in their quest for scarce resources.

NAVSEA did indicate that it would consider authorization of ceiling points in advance of contract award, if requested, in order to aid the SUPSHIPS in shortening the administrative lead-time required to get organized, but this indication is nowhere documented.

### 3. Training Plans

Recognizing the inadequacy of manpower resources and the increasing complexity of field contract administration NAVSEA has undertaken a major attempt at a training plan for SUPSHIP use. The plan, called Skill/Knowledge Improvement Program (SKIP), attempts to display in a matrix format all the functions a SUPSHIP must perform and all the skills and knowledge necessary to perform those functions. It goes further in specifying the depth or degree of skill required for any given function, and lists those courses and schools, etc. through which such a skill might be developed. The S/KIP written by NAVSEA covers only one organizational element of the SUPSHIP. Subsequent portions of the program are to be written by the SUPSHIPS for their own use.

The first part of the SUPSHIP organization addressed is the Production Engineering Division, an element clearly in need of help if it is to perform its intended function. The entire SKIP is based on the assumption that the SUPSHIPS are organized and have responsibilities assigned in accordance with NAVSEA's approved organization outlined in SACAM. Because the Production Engineering Division is



supposed to have the responsibility for C/SCSC surveillance and analysis, the SKIP for the Production Engineering Division addresses C/SCSC skills. A problem here is the fact that no two SUPSHIPS are organized in the same fashion despite the promulgated standard.

To illustrate, Appendix C, extracted from the SKIP, is a list of those skills where an in-depth knowledge is required for effective accomplishment of the Production Engineering Division's C/SCSC responsibility. The list does not include those skills where only a cursory knowledge is required, nor does it include skills required for Production Engineering Division functions other than C/SCSC.

Response by the SUPSHIPS to an advanced copy distributed for review and comment, was mixed. Most of the affirmative comments indicated approval of the method outlined of determining skill requirements, rather than the practicality of actually implementing the program in acquiring needed skills. Some even went to the extent of saying words to the effect, "The format is good, but please don't make compliance a requirement." An interesting insight into NAVSEA's view of the PED is the fact that the SKIP instruction refers to PED members as engineers, not as business or financial people [Ref. 25].







#### IV. ANALYSIS OF FINDINGS

##### A. DISPARITIES BETWEEN SUPSHIP AND NAVSEA APPROACHES

Of the two SUPSHIPS, Bath and Groton, who have undertaken C/SCSC implementation, neither has utilized the NAVSEA suggested approach. In neither has the PED been given the responsibility intended when it was established. Bath intends to work into the suggested organization, but due to difficulties in finding qualified applicants (Bath being situated in a relatively remote, non-industrial corner of the country), and to the time which will be required to transfer the necessary knowledge from the task group to the Production Engineering Division, the process is likely to take years to complete. Groton has no intention of giving to the PED the C/SCSC responsibility intended by NAVSEA, but rather is concentrating its efforts in building up the Business Review Staff. Neither Bath nor Groton is using primarily industrial engineers during implementation, although Bath does intend to use them when the Production Engineering Division is fully manned. Groton is taking a multi-disciplinary approach utilizing primarily business and financial people, but including an industrial engineer.

SUPSHIP personnel are not sufficiently trained in C/SCSC and its implementation, and must rely on NAVSEA and NAVMAT personnel during early contractor reviews. This reliance decreases with subsequent reviews leading to final demonstration review. The point being, that training, formal or on-the-job, has not been sufficiently timely.

Although both Bath and Groton utilized military personnel to supervise the implementation effort, only Groton will maintain this posture. Bath's intended use of the PED does not have military men associated with C/SCSC directly.



## B. REASONS FOR DISPARITIES

The reasons for the disparities are in some cases obvious, but in others they are somewhat subtle. Bath's failure to use the NAVSEA proposed organization to implement C/SCSC is easy to see. Practically speaking, there just wasn't time to establish the PED, hire the necessary talent, and conduct training. In the view of SUPSHIP personnel, this process requires a minimum of one year lead-time before the organization is really ready to function. Assuming that the people you need are available somewhere, the process of writing position descriptions, publishing the opening through the Civil Service Commission, waiting for applicants, interviewing, making a choice, and lastly, waiting for the newly hired applicant to arrive takes from two to ten months. Once people arrive there is usually some administrative time required for familiarization with the organization and the job to be assumed.

C/SCSC schooling is next, but the needed course convenes only quarterly and quotas have to be arranged. The C/SCSC Implementation course itself is three weeks in duration. All of this process is time-consuming, and if not started until after the contract is awarded, guarantees that the SUPSHIP will not be ready to participate in the early reviews.

Authorization for a PED after award of a C/SCSC contract forced the Supervisor to form his team by an alternative method. So, although the Supervisor agreed with the NAVSEA approach, he could not implement it. Bath's use of military personnel was forced upon him due to the constraints of time.

At Groton, the reason was one of philosophy. Groton disagrees with the establishment of a production/industrial engineering organization to handle C/SCSC, and is organizing along the BRS approach. C/SCSC is seen as a task which crosses functional lines and is larger than could properly



be handled by one department. Although hiring and training lead-time were still a problem, the impact was less severe than at Bath because the BRS is authorized independent of contract award and can be organized in advance to be ready to function in a more timely manner.



## V. CONCLUSIONS

As a result of the study conducted, the conclusions fall into four general areas as follows:

1. FUNCTIONAL SKILLS REQUIRED FOR C/SCSC: SUPSHIP Groton has in his organization an element dedicated to the business management of major acquisitions. This element does have the skills outlined in the standard. While SUPSHIP Bath has no such element, it did adequately meet the requirements of implementation, in large part due to the expertise vested in military members of the C/SCSC task group. Should these military members be transferred, SUPSHIP Bath will not have the proper skills for surveillance and analysis. The combination of military members and ad hoc approach is not conducive to long range surveillance and analysis.

2. TRAINING SKILLS REQUIRED FOR C/SCSC: Neither SUPSHIP had significant training in C/SCSC, and neither yet meets the standard. None of Bath's, and only one of Groton's personnel have attended the required course. SUPSHIP Groton is taking steps to acquire the required training by arranging for the AFIT course to be conducted on site.

3. ORGANIZATIONAL APPROACHES: The Production Engineering Division is not at a level within the SUPSHIP organization that will allow it to be staffed with sufficiently talented and experienced personnel to accommodate C/SCSC and other related requirements. Additionally, the PED is too low in the organization to allow it to task other departments where C/SCSC crosses functional lines. The Business Review Staff appears to be a more balanced approach. It draws from several disciplines and provides an organizational element dedicated to the





business and financial aspects of contract administration. Furthermore, it is at a level which does allow for the accumulation of the proper expertise and for the crossing of departmental lines. The task group approach serves only expedience and is not appropriate for a continuing function.

4. THE NAVSEA ROLE: A communication gap exists between NAVMAT and NAVSEA in the guidance to SUPSHIPS. NAVMAT has outlined skills and training required to implement C/SCSC, but NAVSEA seems caught up in a concern for proper organization rather than concerning itself with the skills and expertise required to properly do C/SCSC as does the NAVMAT guidance. The suggested PED indicates a concern for C/SCSC but does not address the larger problem of business management of major acquisitions, in that it does not provide for the handling of related requirements. These new requirements continue to assign new business responsibility to the SUPSHIP without also providing proper resources and guidance. Lastly, the policy of establishing a PED or BRS after contract award comes too late to be of real value to the SUPSHIP.

As stated earlier, C/SCSC is but one tool, but it appears to be one with a good degree of permanence. Other instructions and policy guidance emanating from the various echelons of command either supplement, augment, or exist alongside C/SCSC. For this reason, planning for C/SCSC in the years ahead seems both necessary and desirable. C/SCSC implementation within the Navy and specifically within shipbuilding is most noteworthy in that it lags behind airplanes, missiles, tanks, and satellites (see Appendices D. and E.). Perhaps a broader, more innovative attitude would help in achieving the common purpose of all field contract administration activities, which is to properly balance their effort among the three factors; performance, schedule, and cost.



## VI. RECOMMENDATIONS

At this point the last of the objectives of this study will be addressed in a proposed approach which incorporates lessons learned from those who have been down this road before. It is hoped that this proposal will be considered on its merits by NAVSEA and the SUPSHIPS.

### A. ORGANIZATION

The SUPSHIP standard organization is as it is for a multitude of reasons. Only the assignment of C/SCSC responsibility within that organization is at issue here. It is proposed that NAVSEA authorize a Business Review Staff at any SUPSHIP where there is a good probability of a major contract award. This would not include those SUPSHIPS whose business is primarily the administration of repair contracts. It would include those who are involved with contractors who are actively bidding or negotiating for major contracts. Of top priority would be those SUPSHIPS who are in a position of possible contract administration with a large contractor, such as Boeing, with its involvement in the PHM program, or with several fairly large contractors, such as the combination of Todd, Lockheed, and Boeing, or the combination of Todd, Rohr, and NASSCO. Those SUPSHIPS who have to deal with a very large contractor or several major contractors are in a situation where a centralized monitoring element is needed for C/SCSC and other requirements related to the involvement concept. The staff should be authorized and ceiling points allotted as was originally intended and previously described (see page 30). This BRS should be given full responsibility for DODI 7000.2 and the cost and overhead monitoring requirements of the NPD's.



The Production Management Department and its Production Engineering Division may be established, if desired, to meet other requirements, but should not be tasked with primary C/SCSC responsibility nor established for that purpose. The PED need not be established at all, as is the case at Newport News. Use of such a centralized staff serves to ensure that the business aspects of contract administration are addressed and have a recognized place in the SUPSHIP organization.

## B. PERSONNEL

The ERS should initially include a Lieutenant Commander (postgraduate trained in Acquisition Management), a GS 14/13 Management analyst, a GS 13/12 Procurement Methods Analyst, and a GS 13/12 Industrial Engineer, each to handle contractor systems related to his discipline. When the SUPSHIP has a major contract to administer and the implementation phase is in full swing, additional staff members recommended would be a Cost/Price Analyst with auditing background to serve as overhead monitor and DC&A liaison, and a Materials Specialist knowledgeable in the materials aspects of the shipbuilding industry. Both should be at the GS 13/12 level. Such staffing will allow the SUPSHIP to meet the skill standard previously outlined, and to combine C/SCSC with other monitoring functions with a minimum of duplicative effort.

The Civil Service job classifications are less important than the actual experience desired. For this reason Position Descriptions are critical. The concept of C/SCSC is not difficult and can be acquired by careful reading of the instructions and published guides [Refs. 1,10,20] or through short schools; therefore, emphasis in hiring should not be on previous C/SCSC experience, but rather on past experience in a functional area particularly as it relates to shipbuilding. Position Descriptions should



be directed at a search for knowledge in areas such as materials, budgets, and work breakdowns which cannot be taught in a short period of time.

The staff should be civilian except for its supervisor who should be military in order to have in that position someone who has a broader perspective of the acquisition process and is not likely to suffer from functional loyalties.

#### C. TRAINING

The Lieutenant Commander, or senior member of the BRS, should attend the five day C/SCSC Course for Functional Managers at the Defense Systems Management School at Fort Belvoir. At least two of the other three initial members should have previous experience with C/SCSC or should attend the three-week "Evaluation of Performance Measurement Systems" course at the Air Force Institute of Technology, at Wright-Patterson Air Force Base, Ohio, and attendance by all members is highly desirable.

#### D. ADVANTAGES AND DISADVANTAGES OF RECOMMENDED APPROACH

By authorizing the BRS at certain SUPSHIPS before actual award of any C/SCSC contract, there exists the possibility that some SUPSHIP may have a staff of four persons and no contract. This would certainly constitute overkill and a disadvantage. Also the suggested GS 14/13/12 talent is expensive and does contribute to an already top-heavy Civil Service profile.

The advantages outweigh the disadvantages. Early establishment of a Business Review Staff, independent of contract award, gives the SUPSHIP time to respond and be ready to perform his mission upon execution of a contract. It constitutes a planned approach to an imminent problem rather than a reaction to an existing problem. Lead-time allows for a more thorough hiring process giving the SUPSHIP







the ability to find and hire the man who fits rather than hiring a man and making him fit. Where training is still required after selective hiring, there is time. Time to train personnel may allow hiring at the GS 12 level rather than buying knowledge at the GS 13 level. Probably the largest advantage is that it brings together a broad range of expertise which can provide the Supervisor with evaluative material and recommendations relative to the business/management practices of the shipbuilder, in compliance with the concept of "Engagement," and with DODI 5000.1.

This approach is based on a need for business and management acumen within the SUPSHIPS. It does not see the problem as a need for industrial engineering expertise beyond that which has been discussed. This may be an advantage or a disadvantage depending on the reader's background.

Lastly, some compendium of approaches taken, lessons learned, triumphs and failures should be made available to the Supervisors of Shipbuilding to aid them in achieving their mission objectives with a minimum of costly trials and errors. This study might serve as a start on such a compendium. Regardless of the approach taken by those who in the future must make this decision, the more exhaustive the alternatives considered, the more likely is the decision to be a good one. This approach is but one more alternative.



## APPENDIX A

### OFFICES INTERVIEWED

SUPSHIP Eleven

SUPSHIP Bath

SUPSHIP Groton

SUPSHIP Thirteen

NAVPRO Sikorsky

DCAS Boston Region

NAVMAT

NAVSEA

    SUPSHIP Management Division

        Operations Branch

        Resources Branch

    Contractor Performance Division

        Business Review

        Cost/Schedule Control Systems

    Patrol Frigate Ship Acquisition Project

    Trident Submarine Ship Acquisition Project

    Attack Submarine Ship Acquisition Project



## APPENDIX B

### C/SCSC TRAINING COURSES AVAILABLE

C/SCSC Course for Program Managers -2 1/2 days, Defense Systems Management School (DSMS), Fort Belvoir, Virginia (autovon354-5220)

C/SCSC Course for Functional Managers -5 days, (DSMS)

Evaluation of Performance Measurement Systems -3 weeks, Air Force Institute of Technology, School of Logistics (AFITSL), Wright-Patterson Air Force Base, Ohio (autovon 787-2228/4802)

Surveillance of Performance Measurement Systems -2 weeks (AFITSL)

Managing with Contractor Performance Data -2 weeks, Army Management Engineering Training Agency (AMETA), Rock Island, Ill.



## APPENDIX C

### PED SKILLS REQUIRED FOR C/SCSC ABSTRACTED FROM S/KIP

A. BUSINESS -Skill, knowledge, and capability of determining, evaluating, and understanding the general daily business operations of a contractor.

A-1. Organization: Skill in determining adequacy of contractor organizations. Capability of analyzing organizational charters and their functions in relation to satisfactory accomplishment of the job. Skill in determining how the contractor fits into his corporate structure. In-depth understanding of complicated organizational charts.

A-2. Planning: Skill in determining adequacy of the contractor's planning system. Knowledge of the planning cycle from pre-award of contract to product delivery. Knowledge of how various organizational elements interface for overall planning purposes. Capability of planning a job by incorporating the resources required for total planning.

A-3. Scheduling: Knowledge of the contractor's scheduling system. Skill in determining the adequacy of contractor's schedules. Skill in understanding various types of scheduling techniques and their adequacy for the purpose applied. Capability of determining adequacy of a particular schedule.

A-4. Budgeting: Knowledge of the development of a contractor's budgeting system. Capability to recognize whether budgets are too high or too low for the specific job. Capability to recognize the management reserve budget.





A-5. Industrial Accounting: Knowledge of accounting terms, e.g., overhead direct cost, indirect cost, management reserve, etc. Capability to perform reconciliations of complicated reports. Knowledge of how overhead rates are derived.

A-6. Management: The understanding of contractor management techniques and how they are applied. The understanding of contractor management procedures and the analysis of their effectiveness. Understanding of the needs of contractor management in order to effectively manage a program.

A-7 Contracts: Knowledge of the various types of contracts and their use. Knowledge of the content of the general provisions of a contract and the reason for special contract provisions. Knowledge of who within NAVSEA writes the contract and how input can be provided.

A-8. Work Breakdown Structure (WBS): Skill in ascertaining if the WBS is complete and personnel are assigned work responsibilities. Capability of tracing elements of work from the lower levels of the WBS up to level 1. Skill in developing the Government's WBS for the contract.

A-10. DODI 7000.2: Knowledge of DODI 7000.2 and NAVAT P2540 and their application and use in a contract. Capability of determining if a contractor's cost schedule system meets the intent of DODI 7000.2. Skill in ascertaining changes to a contractor's system in relation to meeting the intent of the validated system.

B. ANALYSIS - Skill, knowledge and capability of performing a variety of analytic techniques to correctly evaluate contractor provided information.

B-1. Analytic: Skill in reviewing the various elements of the contractor's position in proper perspective. Capability



of bumping the contractor's position against a pre-determined workable concept. Skill in applying mathematics to formulate a Navy position.

B-2. Reconcilliations: Capability of sorting through various reports to verify contractor statements. Knowledge of which reports or computer runs will provide the data required and if such data is valid. Knowledge in the use of desk calculators and advanced mathmatics.

B-3. Cost Analysis: Capability of determining the validity of contractor's price proposals. Capability of determining the validity of the standards used for determining price. Capability of developing escalation factors and applying them to the contractor's price to determine its validity.

C. PRODUCTION - Skill, knowledge and understanding of hardware, software, personnel, and techniques used in shipyard production.

C-1. Estimating: Skill in identifying adequacy of contractor's budgeting of work, e.g., are work packages budgeted too high or too low. Knowledge of the contractor's estimating system. Skill in determining the adequacy of the contractor's estimating standards and if derived in a logical manner.

C-2. Shipyard Skills and Trades: Understanding of skill requirements for various shipyard trades. Capability of distinguishing the difference between good and poor workmanship. Knowledge of trades required during various construction schedule time frames.

C-7. Industrial Engineering: Understanding of plant layout. Capability of developing facility analysis and ascertaining skill requirement analysis. Skill in determining adequacy of production menthods. Knowledge of industrial engineering in the shipbuilding industry.



C-8. Plan Understanding: Skill in understanding the most difficult engineering drawings and in visualizing potential drawing changes.

D. SUSHIP INTERFACES - Knowledge and understanding of relationships and interfaces between and among government and non-governmental organizations interfacing with the SUPSHIPS.

D-1. Navy/Contractor Relationship: Knowledge of Navy policy governing communications with contractors. Knowledge of proper methods and channels for discussions with contractor, documentation of discussions/meetings with contractor, formal written communications with contractor. Skill in properly challenging contractor statements or letters with facts formulated from in-depth Navy reviews.

D-2. SACAM: Knowledge of the Ship Acquisition Contract Administration Manual and its effects on a SUPSHIP office.

D-5. SUPSHIP/NAVSEA Relationship: Knowledge of who the cognizant SHAPM for a particular contract is, who to call in NAVSEA for assistance with particular problems. Skill in identifying problems requiring solutions at SUPSHIP or NAVSEA level. Understanding of NAVSEA and its various field activities and their places in the program cycle.

D-6. Change Order Cycle: Knowledge of the change order cycle in a particular contract and MIL-STD-480. Knowledge of who initiates change orders. Understanding of engineering change proposals initiation and process of becoming formal changes. Knowledge of negotiations of the change up to adjudication.

G. GENERAL - Skill, knowledge, and capability of various procedures and techniques that assist SUPSHIP personnel in daily operations.

G-1. Technical Writing: Capability of writing technical



reports or letters in a clear, concise, comprehensive manner.

G-2. Verbal Communications: Capability of stating what has to be said in a clear manner that is understood by all people. Capability of chairing meetings and leading discussions that produce constructive results.

G-3. Math and Statistics: Capability of using mathematical principles in computations needed in other skill/knowledge requirements. Knowledge of basic statistical terminology. Ability to interpret and use statistics correctly.





## APPENDIX D

### C/SCSC ACCEPTANCE/VALIDATIONS

<u>CONTRACTOR</u>	<u>PROGRAM</u>
AEROJET ELECTROSYSTEMS	DEF. SUPPORT AF
AEROJET LIQUID ROCKET	TITAN III AF
AEROJET SOLID PROPULSION	MINUTEMAN
AVCO	MINUTEMAN AF
AVCO	A-X □
AVCO GOVERNMENT PROD.	ABRES AF
BELL AEROSPACE	HELLFIRE MSL A
BELL AEROSPACE	MINUTEMAN □
BELL HELICOPTER	ATK HELICOPTER A
BELL HELICOPTER	214 HELICOPTER □
BOEING	AWACS □
BOEING	MINUTEMAN □
BOEING	SRAM AF
BOEING	SRAM(PROD) □
BOEING VERTOL	HLH □
BOEING VERTOL	UTTAS A
CADILLAC GAGE	XM-1 A
CHRYSLER DEFENSE	XM-1 □
CHRYSLER DEFENSE	XM-1 A
COLLINS RADIC	FLEETSATCOM □
DELCO ELECTRONICS	TITAN III #
FAIRCHILD REPUBLIC	A-X □
FAIRCHILD REPUBLIC	A-10 A
FMC	ARSV-MICV □
GENERAL DYNAMICS	STINGER MSL □
GENERAL DYNAMICS	F-111 AF
GENERAL ELECTRIC	C-5A ENGINE AF



GENERAL ELECTRIC  
GENERAL ELECTRIC  
GENERAL ELECTRIC  
GENERAL ELECTRIC  
GENERAL ELECTRIC  
GENERAL ELECTRIC  
GENERAL ELECTRIC  
GENERAL MOTORS  
GENERAL MOTORS  
GTE SYLVANIA  
GTE SYLVANIA  
HONEYWELL  
HONEYWELL  
HUGHES AIRCRAFT  
HUGHES AIRCRAFT  
HUGHES AIRCRAFT  
HUGHES AIRCRAFT  
IBM  
KAMAN AEROSPACE  
LITTON SYSTEMS  
LITTON SYSTEMS  
LOCKHEED  
LOCKHEED  
LOCKHEED  
LOCKHEED  
LTV AEROSPACE  
LTV AEROSPACE  
MARTIN MARIETTA  
MARTIN MARIETTA  
MARTIN MARIETTA  
MARTIN MARIETTA  
MCDONNELL  
MCDONNELL-DOUGLAS  
NORTHROP  
PHILCO-FORD  
PHILCO-FORD

B-1 ENGINE AF  
IFA ENGINE □  
GAU-8 □  
SITE DEFENSE A  
UTTAS □  
MINUTEMAN AF  
MINUTEMAN (PROD) □  
HLH □  
XM-1 TANK SYS A  
A-X □  
MINUTEMAN □  
ADAM □  
MINUTEMAN (PROD) AF  
MAVERICK AF  
COBRA ARMAMENT A  
F-15 AVIONICS AF  
MAVERICK (PROD) □  
DNA □  
AWRS □  
AN-TSO-73 #  
TOS A  
ABRES AF  
S-3 N  
POLARIS-POSEIDON TRIDENT N  
ARSV □  
DEF SUPPORT AF  
LANCE #  
CLGP-SAM-D □  
SAFEGUARD A  
TITAN III AF  
SITE DEFENSE #  
F-15 AF □  
ABRES AF  
IFA □  
F-15 □  
HELLFIRE MSL A



PHILCO-FORD  
 PRATT WHITNEY  
 PRATT WHITNEY  
 RADIATION SYS  
 RAYTHEON  
 RAYTHEON  
 RAYTHEON  
 RAYTHEON  
 RAYTHEON  
 RAYTHEON  
 RCA  
 RCA  
 RCA  
 ROCKWELL INT•  
 ROCKWELL INT•  
 ROCKWELL INT•  
 SPERRY SYSTEMS  
 THIOKOL  
 TRACOR  
 TRW SYSTEMS  
 TRW SYSTEMS  
 UNITED AIRCRAFT  
 UNITED TECHNOLOGY CENTER  
 UNIVAC  
 UNIVAC  
 WESTERN ELECTRIC  
 WESTERN ELECTRIC  
 WESTERN ELECTRIC

NATO III □  
 F-15 F-14B □  
 F-15 F-14 (PROD) □  
 DEF SUPPORT AF  
 HAWK □  
 SAM-D □  
 SIDEWINDER □  
 HAWK (PROD) □  
 AEGIS □  
 SAFEGUARD □  
 441 AF  
 SATCOM A  
 AEGIS □  
 MINUTEMAN ≠  
 MINUTEMAN (PROD) AF  
 MINUTEMAN SRAM □  
 PF COMBAT SYSTEM □  
 MINUTEMAN AF  
 MINUTEMAN AF  
 DEF SUPPORT □  
 SITE DEFENCE A  
 UTTAS □  
 TITAN III AF  
 MINUTEMAN ≠  
 MINUTEMAN (PROD) □  
 SAFEGUARD A  
 SAFEGUARD A  
 SAFEGUARD A

A ARMY  
 N NAVY  
 AF AIR FORCE  
 ≠ ARMY AND AIR FORCE  
 □ TRI-SERVICE



## APPENDIX E

### NAVSEA PROJECTS CURRENTLY UNVALIDATED

1. TRIDENT INTEGRATED RADIO ROOM --ITT
2. TRIDENT DESIGN --GENERAL DYNAMICS, ELECTRIC BOAT DIV.
3. SSN 688 --GENERAL DYNAMICS, ELECTRIC BOAT DIV.
4. TRIDENT SONAR --IBM
5. SEA CONTROL SHIP -NASSCO
6. SURFACE EFFECT. SHIP --BELL/ROHR
7. TENDERS --LOCKHEED





## APPENDIX F

### PRODUCTION ENGINEERING DIVISION FUNCTIONS

The Production Engineering Division shall:

(a) Maintain surveillance, and evaluate changes to contractor's cost and schedule control system to ensure compliance with contractual requirements. Identify policies, practices or procedures that are not effective; not in accordance with contractual requirements; or not in compliance with the procedures demonstrated in DODI 7000.2 validation.

(b) Document the Performance Measurement Baseline budget for each contract, track and report performance trends in terms of Budgeted Cost of Work Scheduled, Budgeted Cost of Work Performed, and Actual Cost of Work Performed. Conduct variance analyses to identify potential cost/schedule problems, their causes, and proposed corrective action. Reconcile external Cost Performance Reports with contractor's internal data.

(c) Develop and maintain sufficient familiarity with the contractor's cost estimating system and cost experience to participate effectively in evaluation of contractor's cost proposals and budgets.

(d) Investigate, evaluate, and report on contractor's production processes and productivity. Identify corrective actions that could be taken to correct areas of inefficient work methods, equipment, facilities, low productivity, or, adverse performance trends.

(e) Investigate, evaluate and report on contractor's production facility matters as they relate to ship contract work; including the allocation of facilities to contracts, maintenance actions, improvement plans, and plant equipment procurement programs. Identify Government actions required



to support or modify these activities to ensure cost effective performance on Government contracts.

(f) Develop, implement and carry out a continuing program to compare the costs of work items, functional work areas, and/or contracts with similar work performed by other contractors.

(g) Develop SUPSHIP's position relative to the contractor's capability to produce under a new contract, as a part of a Pre-Award Survey effort.

(h) Monitor the contractor's docking program for Navy ships. This includes surveillance of each docking operation, training of SUPSHIP personnel, reviewing written procedures of both SUPSHIP and contractor, auditing the maintenance condition of the contractor's docks, etc.

(i) The development and promulgation of procedures for the safety and protection of government property such as:

- (1) Nuclear accident/incident
- (2) Heavy weather
- (3) Oxygen charging
- (4) Battery charging
- (5) Environmental protection
- (6) Watertight integrity
- (7) Fire protection



# APPENDIX G

## COST/SCHEDULE CONTROL SYSTEMS CRITERIA

CHECKLIST ITEMS	YES	NO	REMARKS
<b>I. ORGANIZATION</b>			
<b>1. DEFINE ALL THE AUTHORIZED WORK AND RELATED RESOURCES TO MEET THE REQUIREMENTS OF THE CONTRACT, USING THE FRAMEWORK OF THE CWBS.</b>			CRITERIA
a. Is only one CWBS used for the contract (attach copy of CWBS)?			
b. Is the contract work statement relatable to elements of the CWBS and the project summary WBS?			
c. Are the following items included in the CWBS (annotate copy of WBS to show elements below)?			
(1) Applicable project summary WBS elements.			
(2) Contract line items and end items.			
(3) All WBS elements specified for reporting.			
(4) CWBS elements to be subcontracted, with identification of subcontractors.			
(5) Cost accounts.			
<b>2. IDENTIFY THE INTERNAL ORGANIZATIONAL ELEMENTS AND THE MAJOR SUBCONTRACTORS RESPONSIBLE FOR ACCOMPLISHING THE AUTHORIZED WORK.</b>			CRITERIA
a. Are all authorized tasks assigned to identified organizational elements? (This must occur at the cost account level as a minimum. Prepare exhibit showing relationships.)			
b. Is subcontracted work defined and identified to the appropriate subcontractor within the proper WBS element? (Provide representative example.)			
<b>3. PROVIDE FOR THE INTEGRATION OF THE CONTRACTOR'S PLANNING, SCHEDULING, BUDGETING, WORK AUTHORIZATION, AND COST ACCUMULATION SYSTEMS WITH EACH OTHER, THE CWBS AND THE ORGANIZATIONAL STRUCTURE. (Reference format 1.)</b>			CRITERIA



a. Are the subsystems listed above integrated with each other, the CWBS and the organizational structure at the following levels: (Use matrix to illustrate the relationships.)			
(1) Total contract?			
(2) Cost account?			
4. IDENTIFY THE MANAGERIAL POSITIONS RESPONSIBLE FOR CONTROLLING OVERHEAD (INDIRECT COSTS).			CRITERIA
a. Are the individuals responsible for the planning and control of indirect costs (overhead) clearly identified?			
5. PROVIDE FOR INTEGRATION OF THE CWBS WITH THE CONTRACTOR'S FUNCTIONAL ORGANIZATIONAL STRUCTURE IN A MANNER THAT PERMITS COST AND SCHEDULE PERFORMANCE MEASUREMENT FOR CWBS AND ORGANIZATIONAL ELEMENTS. (Reference format 1.)			CRITERIA
a. Is each cost account assigned to a single organizational element directly responsible for the work and identifiable to a single element of the CWBS?			
b. Are the following elements for measuring performance available at the levels selected for control and analysis:			
(1) Budgeted cost for work scheduled?			
(2) Budgeted cost for work performed?			
(3) Applied (actual) costs of work performed?			
II. PLANNING AND BUDGETING			
1. SCHEDULE THE AUTHORIZED WORK IN A MANNER WHICH DESCRIBES THE SEQUENCE OF WORK AND IDENTIFIES THE SIGNIFICANT TASK INTER-DEPENDENCIES REQUIRED TO MEET THE DEVELOPMENT, PRODUCTION, AND DELIVERD REQUIREMENTS OF THE CONTRACT.			CRITERIA
a. Does the scheduling system contain: (Prepare exhibit showing traceability from contract task level to work package schedules.)			
(1) A master program schedule?			





(2) Intermediate schedules as required which provide a logical sequence from the master schedule to the cost account level?		
(3) Detailed schedules which support cost account and work package start and completion dates/events?		
b. Do key milestones identify significant constraints and interfaces?		
c. Does the scheduling system provide for the identification of work progress against technical and other milestones, and also provide for forecasts of completion dates of scheduled work?		
d. Are work packages formally scheduled in terms of physical accomplishment and reflected by calendar dates?		
2. IDENTIFY PHYSICAL PRODUCTS, MILESTONES, TECHNICAL PERFORMANCE GOALS, OR OTHER INDICATORS THAT WILL BE USED TO MEASURE OUTPUT.		CRITERIA
a. Are meaningful indicators identified for use in measuring the status of cost and schedule performance? (Provide representative samples.)		
b. Does the contractor's system identify work accomplishment against the schedule plan? (Provide representative examples)		
c. Are current work performance indicators and goals relatable to original goals as modified by contractual changes and reprogramming actions? (Provide exhibit showing incorporation of changes to original indicators and goals.)		
3. ESTABLISH AND MAINTAIN A TIME-PHASED BUDGET BASELINE AT THE COST ACCOUNT LEVEL AGAINST WHICH CONTRACT PERFORMANCE CAN BE MEASURED. INITIAL BUDGETS ESTABLISHED FOR THIS PURPOSE WILL BE BASED ON THE NEGOTIATED TARGET COST. ANY OTHER AMOUNT USED FOR PERFORMANCE MEASUREMENT PURPOSES MUST BE FORMALLY RECOGNIZED BY BOTH THE CONTRACTOR AND THE GOVERNMENT. (Reference formats 2 and 8.)		CRITERIA



a. Are budgets assigned to cost accounts (and budget planning packages as appropriate) maintained as the performance measurement baseline? (Explain baseline maintenance procedures.)			
b. Is the entire contract planned to the cost account level of detail to the extent practicable? In the event that future contract effort cannot be defined in sufficient detail to allow the establishment of cost accounts; are the budgets assigned to WBS elements at the lowest level of planning detail used for baseline maintenance?			
c. Does the contractor require sufficient detail planning of cost accounts to constrain the application of budget initially allocated for future effort to current effort? (Explain procedure.)			
d. Are cost accounts opened and closed based on the start and completion of work contained therein?			
4. ESTABLISH BUDGETS FOR ALL AUTHORIZED WORK WITH SEPARATE IDENTIFICATION OF COST ELEMENTS (LABOR, MATERIAL, ETC.).			CRITERIA
a. Does the budgeting system contain: (Prepare sample exhibit.)			
(1) The total budget for the contract (including estimates for authorized but unpriced work)?			
(2) Budgets assigned to major functional organizations? (See checklist item II, 9a.)			
(3) Budgets assigned to cost accounts and/or planning packages?			
b. Are the budgets assigned to cost accounts planned and identified in terms of the following cost elements? (Provide exhibit.)			
(1) Direct labor dollars.			
(2) Material and/or subcontract dollars.			
(3) Other direct dollars.			
c. Are budgets or values assigned to work packages in terms of dollars, hours, or other measurable units?			



d. Does the work authorization system contain: (Prepare sample exhibit.)			
(1) Authorization to proceed with all authorized work?			
(2) Appropriate work authorization documents which subdivide the contractual effort and responsibilities within functional organizations.			
(3) Authorizations for work within cost accounts with identification of the responsible organization?			
5. TO THE EXTENT THE AUTHORIZED WORK CAN BE IDENTIFIED IN DISCRETE, SHORT-SPAN WORK PACKAGES, ESTABLISH BUDGETS FOR THIS WORK IN TERMS OF DOLLARS, HOURS, OR OTHER MEASURABLE UNITS. WHERE THE ENTIRE COST ACCOUNT CANNOT BE SUBDIVIDED INTO DETAILED WORK PACKAGES. IDENTIFY THE FAR TERM EFFORT IN LARGER PLANNING PACKAGES FOR BUDGET AND SCHEDULING PURPOSES. (Reference formats 6, 6a, and 6b.)			CRITERIA
a. Do work packages reflect the actual way in which the work will be done and are they meaningful product or management orientated subdivisions of a higher level element of work?			
b. Are detailed work packages planned as far in advance as practicable? (Provide representative sample.)			
c. Is work progressively subdivided into detailed work packages as requirements are defined?			
d. Is future work which cannot be planned in detail subdivided to the extent practicable for budgeting and scheduling purposes. (Provide sample.)			
e. Are work packages reasonably short in time duration to minimize the inprocess effort?			
f. Do work packages consist of discrete tasks which are adequately described? (Provide representative sample.)			
g. Can the contractor substantiate the formulation of work package budgets?			





6. PROVIDE THAT THE SUM OF ALL WORK PACKAGE BUDGETS PLUS PLANNING PACKAGES WITHIN A COST ACCOUNT EQUALS THE COST ACCOUNT BUDGET. (Reference format 2.)			CRITERIA
a. Does the sum of all work package budgets plus planning packages within selected cost accounts equal the budgets assigned to those cost accounts?			
7. IDENTIFY RELATIONSHIPS OF BUDGETS OR STANDARDS IN UNDERLYING WORK AUTHORIZATION SYSTEMS TO BUDGETS FOR WORK PACKAGES.			CRITERIA
a. For the production effort where engineered standards or other internal work measurement systems are used, is there a formal relationship between these values and work package budgets? (Provide samples showing relationships.)			
8. IDENTIFY AND CONTROL LEVEL OF EFFORT ACTIVITY BY TIME-PHASED BUDGETS ESTABLISHED FOR THIS PURPOSE. ONLY THAT EFFORT WHICH CANNOT BE IDENTIFIED AS DISCRETE, SHORTSPAN WORK PACKAGES OR APPORTIONED EFFORT WILL BE CLASSED AS LOE. (Reference format 6.)			CRITERIA
a. Are time-phased budgets established for planning and control of level of effort activity by category of resource, for example, type of manpower and/or material? (Explain method of control and analysis.)			
b. Is work properly classified as measured effort, LOE, or apportioned effort and appropriately separated?			
9. ESTABLISH OVERHEAD BUDGETS FOR THE TOTAL COSTS OF EACH SIGNIFICANT ORGANIZATIONAL COMPONENT WHOSE EXPENSES WILL BECOME INDIRECT COSTS. REFLECT IN THE CONTRACT BUDGETS AT THE APPROPRIATE LEVEL, THE AMOUNTS IN OVERHEAD POOLS THAT WILL BE ALLOCATED TO THE CONTRACT AS INDIRECT COSTS. (Reference DCAA Audit Manual and ASPR-15-203. (Reference format 7).			CRITERIA
a. Are indirect budgets established on a facility-wide basis commensurate with firm and potential business? (Explain procedure.)			





b. Are the facility-wide indirect budgets updated in a timely manner to reflect the realization or nonrealization of potential business and/or changes in the planning base?			
c. Are the indirect pools formally identified? (Provide listing of pools.)			
d. Are the facility-wide budgets identified to responsible organizations and their associated indirect pool for control purposes?			
e. Are indirect budgets and costs properly classified?			
f. Are the contractor's techniques for determining the base and applicable rate for contract overhead budgets acceptable? (Explain procedure.)			
g. Does the contractor identify the level of the WBS and organizational structure where indirect budgets are controlled? (Identify levels.)			
h. Do the indirect rates used to compute the contract indirect cost estimates to complete properly reflect historical experience, economic escalation and anticipated business volume?			
i. Are the procedures for determining facility-wide and contract indirect budgets formally documented?			
10. IDENTIFY MANAGEMENT RESERVES AND UNDISTRIBUTED BUDGET.			CRITERIA
a. Are management reserves separately identified from other budgets?			
b. Are records maintained to show how management reserves are used? (Provide exhibit.)			
c. Are records maintained to show how undistributed budgets are controlled? (Provide exhibit.)			
11. PROVIDE THAT THE CONTRACT TARGET COST PLUS THE ESTIMATED COST OF AUTHORIZED BUT UNPRICED WORK IS RECONCILED WITH THE SUM OF ALL INTERNAL CONTRACT BUDGETS AND MANAGEMENT RESERVES. (Reference formats 3, 4 and 5.)			CRITERIA



a. Do the sum of the cost account budgets and management reserves reconcile with the contract target cost plus the estimated cost for authorized unpriced work? (Provide exhibit.)

### III. ACCOUNTING

1. RECORD DIRECT COSTS ON AN APPLIED OR OTHER ACCEPTABLE BASIS CONSISTENT WITH THE BUDGETS IN A FORMAL SYSTEM THAT IS CONTROLLED BY THE GENERAL BOOKS OF ACCOUNT. WHERE AN APPLIED DIRECT COST BASIS IS USED INCLUDE WITHIN THE COST ACCOUNTS THE AMOUNTS CHARGED TO WORK IN PROCESS IN THE TIME PERIOD WHEN: LABOR, MATERIAL, AND OTHER DIRECT RESOURCES ARE ACTUALLY CONSUMED; OR MATERIAL RESOURCES ARE WITHDRAWN FROM INVENTORY FOR USE; OR MATERIAL RESOURCES ARE RECEIVED THAT ARE UNIQUELY IDENTIFIED TO THE CONTRACT AND SCHEDULED FOR USE WITHIN 60 DAYS; OR MAJOR COMPONENTS OR ASSEMBLIES ARE RECEIVED ON A LINE FLOW BASIS THAT ARE SPECIFICALLY AND UNIQUELY IDENTIFIED TO A SINGLE SERIALY NUMBERED END ITEM.

CRITERIA

a. Does the contractor use procedures for recording direct costs of material which facilitate performance measurement and determination of unit or lot costs when applicable?

b. If the contractor uses applied direct cost basis for material, do amounts charged to cost accounts for work in progress reflect one or a combination of the time period criteria defined above?

c. Does the accounting system provide a basis for auditing records of applied (actual) direct costs and indirect costs chargeable to the contract?

d. Are elements of cost (labor, material, etc.) separately identified on a basis consistent with the way such costs are budgeted?



2. FOR SOME APPLICATIONS, ACTUAL COSTS FOR MATERIAL RECORDED ON OTHER THAN AN APPLIED DIRECT COST BASIS MAY BE SELECTED. WHEN USED, THE CONTRACTORS' MATERIAL ACCOUNTING SYSTEM MUST FACILITATE PERFORMANCE MEASUREMENT AND DETERMINATION OF UNIT OR LOT COSTS WHEN APPLICABLE. THEY MUST PROVIDE FOR: PRICE VARIANCE DETERMINATION: USAGE VARIANCE DETERMINATION: ACCURATE COST ACCUMULATION AND ASSIGNMENT OF COSTS TO COST ACCOUNTS IN A MANNER CONSISTENT WITH THE BUDGETS USING RECOGNIZED, ACCEPTABLE COSTING TECHNIQUES: AND MATERIAL ACCOUNTABILITY.

CRITERIA

a. Do the contractor's procedures for recording costs facilitate performance measurement and determination of unit or lot costs when applicable?

b. Does the contractor's system provide for material price and usage variance determination?

c. Are material costs assigned to cost accounts and accumulated in a manner consistent with the budgets using recognized acceptable costing techniques?

3. SUMMARIZE DIRECT COSTS FROM THE COST ACCOUNTS INTO THE WBS WITHOUT ALLOCATION OF A SINGLE COST ACCOUNT TO TWO OR MORE WBS ELEMENTS. (Reference formats 3 and 5).

CRITERIA

a. Is it possible to summarize direct costs from the cost account level through the WBS to the total contract level without allocation of a lower level WBS element to two or more higher level WBS elements? (This does not preclude the allocation of costs from a cost account containing common items to appropriate using cost accounts.)

4. SUMMARIZE DIRECT COSTS FROM THE COST ACCOUNTS INTO THE CONTRACTOR'S FUNCTIONAL ORGANIZATIONAL STRUCTURE WITHOUT ALLOCATION OF A SINGLE COST ACCOUNT TO TWO OR MORE ORGANIZATIONAL ELEMENTS. (Reference formats 4 and 5.)

CRITERIA

a. Is it possible to summarize direct costs from the cost account level to the highest functional organizational level without allocation of a lower level organization's costs to two or more higher level organizations?





5. RECORD ALL INDIRECT COSTS WHICH WILL BE ALLOCATED TO THE CONTRACT (REFERENCE DCAA AUDIT MANUAL AND ASPR-15-203.)

CRITERIA

a. Does the cost accumulation system provide for summarization of indirect costs from the point of allocation to the contract total?

b. Are indirect costs, facility-wide and by contract, accumulated so as to provide a basis for comparison between planned and actual indirect costs?

c. Is the authority for incurring indirect costs commensurate with responsibility for management control of these costs? (Explain controls for fixed and variable indirect costs.)

d. Are indirect costs charged to the appropriate indirect pools and incurring organization?

e. Are the bases and rates (booking rates) for allocating costs from each indirect pool consistently applied?

f. Are the bases and rates (booking rates) for allocating costs from each indirect pool to commercial work consistent with those used to allocate such costs to government contracts?

g. Are the rates (booking rates) for allocating costs from each indirect cost pool to contracts updated as necessary to assure a realistic monthly allocation of indirect costs without significant year end adjustments?

h. Is it possible to summarize indirect costs from the point of allocation to the CWBS to the contract level without allocation of two or more higher level elements?

i. Are the procedures for identifying indirect costs to incurring organizations, indirect cost pools, and allocating the costs from the pools to the contracts formally documented?

6. IDENTIFY THE BASES FOR ALLOCATING THE COST OF APPORTIONED EFFORT.

CRITERIA

a. Is apportioned effort directly related to discrete work packages? (Provide example.)





b. Are methods used for applying apportioned effort costs to cost accounts applied consistently and documented in an established procedure?			
c. Is effort which is appropriately planned and controlled based on existing work packages identified as apportioned effort?			
7. IDENTIFY UNIT COSTS, EQUIVALENT UNIT COSTS, OR LOT COSTS AS APPLICABLE.			CRITERIA
a. Does the contractor's system provide unit costs, equivalent unit costs or lot costs in terms of labor, material and other direct and indirect costs? (Describe procedure.)			
IV. ANALYSIS			
1. IDENTIFY AT THE COST ACCOUNT LEVEL ON A MONTHLY BASIS USING DATA FROM, OR RECONCILABLE WITH, THE ACCOUNTING SYSTEM: BCWS AND BCWP; BCWP AND APPLIED (ACTUAL WHERE APPROPRIATE) DIRECT COSTS FOR THE SAME WORK; VARIANCES RESULTING FROM THE ABOVE COMPARISONS CLASSIFIED IN TERMS OF LABOR, MATERIAL, OR OTHER APPROPRIATE ELEMENTS, TOGETHER WITH THE REASONS FOR SIGNIFICANT VARIANCES.			CRITERIA
a. Does the contractor's system include procedures for measuring performance of the lowest level organization responsible for performing work? (Provide typical example.)			
b. Does the contractor measure cost and schedule performance in a consistent, systematic manner?			
c. Are the applied (actual) direct costs used for variance analysis reconcilable with data from the accounting system?			
d. Is budgeted cost for work performed calculated in a manner consistent with the way work is planned (for example, if work is planned on a measured basis, budgeted cost for work performed is calculated on a measured basis.)			
e. Does the contractor have variance analysis procedures and a demonstrated capability for identifying (at the cost account and other appropriate levels) cost and schedule variances resulting from his system, which: (Provide examples.)			



(1) Identify and isolate problems causing unfavorable cost variances?			
(2) Evaluate the impact of schedule changes, work around, etc.?			
(3) Evaluate the performance of operating organizations?			
(4) Identify potential or actual overruns and under-runs?			
2. IDENTIFY ON A MONTHLY BASIS IN THE DETAIL NEEDED BY MANAGEMENT FOR EFFECTIVE CONTROL, BUDGETED INDIRECT COSTS, ACTUAL INDIRECT COSTS, AND VARIANCES ALONG WITH THE REASONS THEREFOR.			CRITERIA
a. Are variances between budgeted and actual indirect charges determined and analyzed at the level where responsibility for control of such costs is assigned (indirect pool, department, etc.)?			
b. Does the contractor's variance analysis capability permit him to identify cost variances resulting from: (Provide example and relate to financial reports provided to Government.)			
(1) Changes in overhead rates?			
(2) Changes in overhead base?			
c. Is management corrective action taken to reduce indirect costs where significant variances are noted?			
3. SUMMARIZE THE DATA ELEMENTS AND ASSOCIATED VARIANCES LISTED IN ITEMS 1 AND 2 ABOVE THROUGH THE CONTRACTOR ORGANIZATION AND WBS TO THE REPORTING LEVEL SPECIFIED IN THE CONTRACT. (Reference formats 2, 3, 4, 5, 10, and 11.)			CRITERIA
a. Are data elements (budgeted cost for work scheduled, budgeted cost for work performed, and actual cost) progressively summarized from the detail level to the contract level through the WBS? (Provide exhibit.)			



b. Are data elements summarized through the functional organization structure for progressively higher levels of management? (Provide exhibit.)			
c. Are summarized data elements reconcilable between internal summary reports and reports forwarded to the Government.			
d. Are procedures for variance analysis documented and consistently applied at the cost account level and selected WBS and organizational levels at least monthly as a routine task? (Provide examples.)			
4. IDENTIFY ON A MONTHLY BASIS SIGNIFICANT DIFFERENCES BETWEEN PLANNED AND ACTUAL SCHEDULE ACCOMPLISHMENT TOGETHER WITH THE REASONS THEREFOR.			CRITERIA
a. Does the scheduling system identify work which is behind schedule in a timely manner? (Provide representative examples.)			
b. Does the contractor's system include the recording of objective results, design reviews, and tests to provide credible schedule information? (Provide examples.)			
5. IDENTIFY MANAGERIAL ACTIONS TAKEN AS A RESULT OF CRITERIA ITEMS 1 THRU 4 ABOVE.			CRITERIA
a. Is timely and auditable data disseminated to the contractor's managers? (Provide examples.)			
b. Are data being used by managers in an effective manner to ascertain program or functional status to identify reasons for significant variances, and to initiate appropriate corrective action. (Provide examples.)			
c. Are there procedures for monitoring action items and corrective actions to the point of resolution and are these procedures being followed?			
6. BASED ON PERFORMANCE TO DATE AND ON ESTIMATES OF FUTURE CONDITIONS, DEVELOP REVISED ESTIMATES OF COST AT COMPLETION FOR WBS ELEMENTS IDENTIFIED IN THE CONTRACT AND COMPARE THESE WITH THE CONTRACT BUDGET BASELINE AND THE LATEST STATEMENT OF FUNDS REQUIREMENTS REPORTED TO THE GOVERNMENT.			CRITERIA





a. Are estimates of costs at completion based on performance to date, actual costs to date, knowledgeable projections of future performance, and estimates of the cost for contract work remaining to be accomplished?			
b. Are estimates of costs at completion generated with sufficient frequency to provide identification of future cost problems in time for possible corrective or preventive actions by both the contractor and the Government project manager?			
c. Are estimates of cost at completion generated for the following levels:			
(1) The program, as defined by the contractually authorized work plus contractually specified options? (Where the options include variable production lot quantities recurring revised estimates need only be generated for median or nominal quantities.)			
(2) Total contract (all authorized work)?			
(3) WBS elements contractually specified for reporting of status to the Government (Lowest level only)?			
(4) Major subcontracts?			
(5) Major functional areas of contract effort?			
(6) Cost accounts?			
d. Are the latest revised estimates of costs at completion at the appropriate levels compared with the following items, and their causes identified:			
(1) Program ceiling price(s) by lot or option, if applicable?			
(2) Contract budget baseline?			
e. Are estimates of costs at completion generated in a rational, consistent manner? Are there procedures established for appropriate aspects of generating estimates of costs at completion?			
f. Are estimates of costs at completion utilized in determining contract funding requirements and reporting them to the Government?			
g. Are the contractor's estimates of costs at completion reconcilable with cost data reported to the Government?			





## V. REVISIONS AND ACCESS TO DATA

1. INCORPORATE CONTRACTUAL CHANGES IN A TIMELY MANNER, RECORDING THE EFFECTS OF SUCH CHANGES IN BUDGETS AND SCHEDULES. IN THE DIRECTED EFFORT PRIOR TO NEGOTIATION OF A CHANGE, BASE SUCH REVISIONS ON THE AMOUNT ESTIMATED AND BUDGETED TO THE FUNCTIONAL ORGANIZATIONS.

CRITERIA

a. Are authorized changes being incorporated in a timely manner?

b. Are all affected work authorization, budgeting, and scheduling documents amended to properly reflect the effects of authorized changes? (Provide examples.)

c. Are internal budgets for authorized, but not priced changes based on the contractor's resource plan for accomplishing the work?

2. RECONCILE ORIGINAL BUDGETS FOR THOSE ELEMENTS OF THE WBS IDENTIFIED AS PRICED LINE ITEMS IN THE CONTRACT, AND FOR THOSE ELEMENTS AT THE LOWEST LEVEL OF THE DOD PROJECT SUMMARY WBS, WITH CURRENT PERFORMANCE BUDGETS IN TERMS OF CHANGES TO THE AUTHORIZED WORK AND INTERNAL REPLANNING IN THE DETAIL NEEDED BY MANAGEMENT FOR EFFECTIVE CONTROL.

CRITERIA

a. Are current budgets resulting from changes to the authorized work and/or internal replanning, reconcilable to original budgets for specified reporting items?

3. PROHIBIT RETROACTIVE CHANGES TO RECORDS PERTAINING TO WORK PERFORMED THAT WILL CHANGE PREVIOUSLY REPORTED AMOUNTS FOR DIRECT COSTS, INDIRECT COSTS, OR BUDGETS, EXCEPT FOR CORRECTION OF ERRORS AND ROUTINE ACCOUNTING ADJUSTMENTS.

CRITERIA

a. Are retroactive changes to direct costs, indirect costs prohibited and avoided, except for the correction of errors and routine accounting adjustments?

b. Are direct or indirect cost adjustments being accomplished in accordance with accounting procedures acceptable to DCAA?



c. Are retroactive changes to BCWS and BCWP prohibited except for correction of errors or for reasons agreed to by the contracting parties?

4. PREVENT REVISIONS TO THE CONTRACT BUDGET BASELINE EXCEPT FOR GOVERNMENT DIRECTED CHANGES TO CONTRACTUAL EFFORT OR CHANGES RESULTING FROM FORMAL REPROGRAMMING.

CRITERIA

a. Are procedures established to prevent changes to the contract budget baseline (see definition) other than those authorized by contractual action or formal reprogramming?

b. If interim budgets for authorized changes do not equal negotiated cost for the changes, does the contractor compensate for the differences with either management reserve or by revising interim budgets to equal the negotiated cost?

5. CHANGES TO THE PERFORMANCE MEASUREMENT BASELINE WILL BE INTERNALLY DOCUMENTED. TIMELY NOTIFICATION OF THESE CHANGES WILL BE PROVIDED TO THE PROCURING ACTIVITY THRU PRESCRIBED PROCEDURES.

CRITERIA

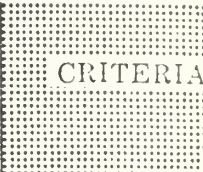
a. Are changes to the performance measurement baseline (cost account) made as a result of contractual redirection, formal reprogramming, or the use of management reserve, properly documented and reflected in the Cost Performance Report?

b. Is the procuring activity notified of internally generated changes to the performance measurement baseline in a timely manner through an established procedure? (Explain procedures.)

c. Are procedures in existence that prevent changes to budgets for open work packages and are these procedures adhered to?

d. Are retroactive changes to budgets for completed work specifically prohibited in an established procedure and is this procedure adhered to?



6. THE CONTRACTING OFFICER AND HIS DULY AUTHORIZED REPRESENTATIVES WILL BE PROVIDED ACCESS TO ALL OF THE FOREGOING INFORMATION AND RECORDS IN SUPPORT THEREOF.			
a. Has the contractor provided access to all pertinent records to the Evaluation Review Team and surveillance personnel?			



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23. Draft Naval Sea Systems Command Instruction, "Standard Supervisor of Shipbuilding, Conversion and Repair, USN, Organization Manual."
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